ENVIRONMENTAL ASSESSMENT

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APPLICATION PURSUANT TO SECTION 75W OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

PROPOSED ALTERATIONS TO EXISTING FLOUR MILL RELATING TO PROJECT APPROVAL MP06_0228 SHOALHAVEN STARCHES EXPANSION PROJECT

LOT 1 DP 838753
160 BOLONG ROAD
BOMADERRY

Prepared for

Shoalhaven Starches Pty Ltd

November 2015

Prepared by:

COWMAN STODDART PTY LTD

Town Planning, Agricultural & Environmental Consultants

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OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

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Ref. 15/49

Town Planning, Agricultural & Environmental Consultants

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CERTIFICATION OF ENVIRONMENTAL ASSESSMENT

PREPARED PURSUANT TO PART 3A OF THE *ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979*

ENVIRONMENTAL ASSESSMENT PREPARED BY

Name:	S. D. Richardson
Qualifications:	M. Appl. Sc., B.T.P., Grad. Dip. Env. Mgt, CPP, MPIA
Address:	Cowman Stoddart Pty Ltd 31 Kinghorne Street NOWRA NSW 2541

in respect of

PROJECT TO WHICH PART 3A APPLIES

Proponent Name:	Shoalhaven Starches Pty Ltd
Proponent Address:	Bolong Road, Bomaderry
Land to be developed: Address	Bolong Road, Bomaderry
Lot No., DP/MPS, Vol/Fol etc.	Lot 1 DP 838753
Project Development:	Shoalhaven Starches Expansion Project (MP 06_0228)
Proposed Modification to Project:	Proposed modifications to Project Approval (MP06_0228) involving alterations to existing Flour Mill.

Environmental Assessment An Environmental Assessment is attached

Certification

I certify that I have prepared this environmental assessment and to the best of our knowledge

- It has been prepared in accordance with Section 75W of the *Environmental Planning and Assessment Act 1979,*
- The information contained in the Environmental Assessment is neither false nor misleading.

Signature: _____

Name: S. D. Richardson

Date: 12th November 2015

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EXECUTIVE SUMMARY

Shoalhaven Starches is a member of the Manildra Group of companies. The Manildra Group is a wholly Australian owned business and the largest processor of wheat in Australia. It manufactures a wide range of wheat based products for food and industrial markets both locally and internationally.

The Shoalhaven Starches factory located on Bolong Road, Bomaderry produces a range of products for the food, beverage, confectionary, paper and motor transport industries including: starch, gluten, glucose and ethanol.

On the 4th October 2007 the then Minister for Planning issued Project Approval MP 07_0021 for the establishment of a flour mill at the Shoalhaven Starches factory site. This project enabled the construction and operation of a new flour mill and two grain silos. The Flour Mill produces 265,000 tonnes of industrial grade flour a year for use within the Shoalhaven Starches factory. The Flour Mill is housed in a building within proximity of the southern boundary of the factory. The grain silos associated with this previous approval are located within the vicinity of this Flour Mill, and have capacity to store 3600 tonnes of wheat grain.

In 2009 the Minister for Planning issued Project Approval for an application made by Shoalhaven Starches to increase its ethanol production capacity to meet the expected increase in demand for ethanol arising from the ethanol mandate by upgrading the existing ethanol plant located at the Shoalhaven Starches Plant at Bomaderry. This Project Approval enables Shoalhaven Starches to increase its ethanol production in a staged manner at its Bomaderry Plant from the current approved 126 million litres per year to 300 million litres per year subject to certain conditions.

The Project Approval also consolidated all previous approvals including Project Approval MP 07_0021 (the Flour Mill) into the one Project Approval.

Following the Minister's determination Shoalhaven Starches have been implementing and commissioning works in accordance with this approval.

15,000 tonnes per week of flour is approved to be transported to the site by rail for use in the production process at the site in conjunction with 5000 tonnes per week of flour that is presently milled by the existing Flour Mill located on the site approved in 2007.

Shoalhaven Starches now propose to undertake modifications to the existing Flour Mill to increase industrial grade flour production at the Bomaderry Plant. The proposed alterations to the existing Flour Mill will process 3,375 tonnes per week of grain producing 2,700 tonnes per week of flour. In conjunction with the flour already processed on the site, this will mean that

7,700 tonnes of flour will be able to be produced at the Bomaderry plant per week, with the remaining 12,300 tonnes of flour being transported by rail to the site from Manildra.

The proposal however does not seek to increase the amount of flour that is processed on site above the current approved 20,000 tonnes per week.

The proposed alterations to the existing Flour Mill at the Bomaderry site will enable subsequent spare capacity at the Company's other Flour Mills to be devoted to the production of higher grade flour therefore increasing export opportunities for the Company.

New equipment will be housed largely within the confines of the existing Flour Mill building footprint only; no significant external additions to the existing building footprint are necessary, although the proposal will involve additional plant being located on top of the existing building. A minor external extension is proposed between the Flour Mill building and silos.

The application is made pursuant to Section 75W of the Environmental Planning & Assessment Act 1979.

The preparation of this Environmental Assessment has been undertaken following consultation with the Department of Planning and Environment.

This Environmental Assessment has been prepared to address issues detailed in these requirements.

The EA is supported by expert assessments addressing:

- Noise Impacts – the EA is supported by a Noise Impact Assessment prepared by Day Design Pty Ltd which includes recommendations to ensure that this proposal will achieve the noise limits as outlined under the Environmental Protection Licence that applies to the site. Furthermore noise emission during the construction phase of the development will meet noise management levels set by the EPA's relevant guidelines.
- Air Quality Impacts and including Odours – the EA is supported by an Air Quality Impact Assessment prepared by Stephenson Environmental Management Australia (SEMA). This assessment demonstrates that the proposal will meet relevant assessment criteria in terms of odour emissions and particulates.
- Flooding Impacts - the EA is supported by a report prepared by WMAwater which demonstrates that the proposal will have no impacts on flood levels.
- Preliminary Hazard Analysis (PHA) prepared by Pinnacle Risk Pty Ltd that assesses and compares the risks associated with the proposal against the Department of Planning's risk criteria and in summary finds that the development will have no adverse off-site impacts and all relevant risk criteria are expected to be satisfied.

- Traffic Impact Assessment prepared by ARC Traffic and Transport that identifies that there are no access or traffic impacts associated with the proposal – either during operation or construction – that would significantly impact on the efficiency and/or safety of the local traffic environment or existing on-site operations. The trip generation of the proposal during construction would be extremely minor, while once operational the proposal is not expected to generate any additional trips to the local road network.
- Geotechnical Assessment prepared by Coffey Geotechnics that addresses the implications of the proposal for river bank stability for the banks of the adjacent Shoalhaven River. This assessment considers that the impact of the proposed modification to the existing Flour Mill on river bank stability would be insignificant.

Following an assessment of the key issues associated with this proposal, this Environmental Assessment concludes that the proposal is suitable for the site and this locality.

The Minister's approval is sought for the modification application.

1.0 INTRODUCTION

1.1 BACKGROUND TO SHOALHAVEN STARCHES

This Environmental Assessment has been prepared to address the key environmental issues associated with a proposal by Shoalhaven Starches Pty Ltd to undertake modifications to the existing Flour Mill to increase the amount of flour that will be able to be produced on the existing Shoalhaven Starches factory site.

Shoalhaven Starches is a member of the Manildra Group of companies. The Manildra Group is a wholly Australian owned business and the largest processor of wheat in Australia. It manufactures a wide range of wheat based products for food and industrial markets both locally and internationally.

The Shoalhaven Starches factory produces a range of products for the food, beverage, confectionary, paper and motor transport industries including: starch, gluten, glucose and ethanol. During these processes, treated waste water is produced and spray irrigated onto pastures of the Company's Environmental Farm, which comprises over 1000 ha of land situated to the north of the factory site.

In 2003, the Minister for Planning approved a development application (DA223) for the Company's Pollution Reduction Program No. 7. This approval included the extension of the company's irrigation of waste water onto additional farm lands and also enabled ethanol production at the plant to increase from 100 million litres per year to 126 million litres per year.

On the 4th October 2007 the then Minister for Planning issued Project Approval MP 07_0021 for the establishment of a Flour Mill at the factory site. This project enabled the construction and operation of a new flour mill and two grain silos. The Flour Mill is currently approved to produce 265,000 tonnes of industrial grade flour a year for use within the Shoalhaven Starches factory. The Flour Mill is housed in a building on the southern boundary of the factory. The grain silos associated with this previous approval are located within the vicinity of this Flour Mill, and have capacity to store 3600 tonnes of wheat grain.

On the 28th January 2009 the Minister for Planning issued Project Approval MP 06_0228 for the "Shoalhaven Starches Expansion Project" (SSEP).

The primary objective of the Shoalhaven Starches Expansion Project was to increase the Company's ethanol production capacity by upgrading the existing plant to meet the expected increase in demand for ethanol arising from Federal and State Government policy initiatives to mandate the use of ethanol in fuel supplies.

As a result, the Manildra Group planned to increase its ethanol production capacity to meet the expected increase in demand for ethanol arising from these initiatives by upgrading the existing ethanol plant, located at the Shoalhaven Starches Plant at Bomaderry.

The Project Approval for the Shoalhaven Starches Expansion Project (SSEP), enabled Shoalhaven Starches subject to certain conditions to increase ethanol production in a staged manner at its Bomaderry Plant from the previous approved level of 126 million litres per year to 300 million litres per year.

In addition the Project Approval consolidated all previous approvals for the site, including MP 07_0021 for the existing Flour Mill into the one Project Approval for the overall site.

To accomplish the increase in ethanol production, the Project Approval enabled Shoalhaven Starches to upgrade plant and increase throughput of raw materials, principally flour and grain. The following additions and alterations have been approved to the existing factory site as part of the Project Approval:

- the provision of an additional dryer for the starch/gluten plant;
- additional equipment and storage vessels for the ethanol plant including 3 additional fermenters, additional cooling towers and molecular sieves; and
- upgrades to the Stillage Recovery Plant including 6 additional Dried Distillers Grains Syrup (DDGS) dryers; 10 decanters; chemical storage and two evaporators. The proposal includes the installation of a DDGS Pelletiser Plant within this part of the site.

Since obtaining this Project Approval Shoalhaven Starches have acquired the former Dairy Farmers factory complex further to the east of the Company's factory site.

1.2 BACKGROUND TO PROJECT

The Manildra Group has been in flour milling since 1952 when the first flour mill was purchased in the NSW country town of Manildra.

The Manildra Group owns and operates flour mills at four locations within New South Wales:

- Manildra;
- Gunnedah;
- Narrandera;
- The Bomaderry factory site.

The Manildra mills use state of the art equipment and technology to produce a full range of wheat flours and mixes for domestic and international markets. The Manildra Group has extensive milling capabilities with the Manildra mill ranking amongst the 10 largest mills in the world. The three mills actually compromise a total of six separate milling systems that allow the Company to produce an extensive range of flours, semolinas and specialty products.

The Company is vertically integrated with the majority of the flour produced at the Manildra mill being further processed at Manildra Group's main manufacturing facility at Bomaderry within the Shoalhaven local government area.

The Shoalhaven Starches Factory (which forms part of the Manildra Group of Companies) located on Bolong Road, Bomaderry produces a range of products for the food, beverage, confectionary and paper producing industries including: starch, glucose and ethanol.

In 2007, the NSW Government issued Project Approval for the construction of a Flour Mill on the Shoalhaven Starches factory site. This Flour Mill has now been constructed on site and is operating in accordance with this approval. Wheat is transported directly to the site by train and processed in the existing Flour Mill into industrial grade flour for use in the production of starch and gluten at the Bomaderry Plant.

At present flour used in the production process at the Bomaderry plant is supplied by the Company's flour mills at Manildra, Gunnedah, Narrandera as well as the existing flour mill located on the subject site. The train loads are brought to the plant via the switching yard at Bomaderry.

The husk (mill feed) material from the processing of this wheat will then be able to be used in the DDG dryers.

As a result the equivalent amount of flour and mill feed was no longer needed to be transported to the site.

The existing Flour Mill at the Bomaderry site processes approximately 5,000 tonnes of industrial grade flour per week producing approximately 265,000 tonnes of industrial grade flour per annum for use in the Bomaderry Plant.

15,000 tonnes per week of flour is approved to be transported to the site by rail for use in the production process at the site in conjunction with 5,000 tonnes per week of flour that is presently milled on the site.

It is now proposed to undertake modifications to the existing Flour Mill to increase industrial grade flour production at the Bomaderry Plant. This will enable subsequent

spare capacity at the Company's other flour mills to be devoted to the production of higher grade flour therefore increasing export opportunities for the Company.

The proposed modifications to the existing Flour Mill will process 3,375 tonnes per week of grain producing 2,700 tonnes per week of flour. In conjunction with the flour already processed on the site, this will mean that 7,700 tonnes of flour will be able to be produced at the Bomaderry plant per week, reducing the amount of flour that is required to be transported to the site to 12,300 tonnes from Manildra.

The proposal will not alter the approved flour consumption of the plant, which is 20,000 tonnes per week.

1.3 THE PROPONENT

Cowman Stoddart Pty Ltd has prepared this Environmental Assessment on behalf of Shoalhaven Starches Pty Ltd.

Proponent's name:	Shoalhaven Starches Pty Ltd
Postal address:	PO Box 123, Nowra 2541
ABN No:	94 000 045 045

2.0 THE SITE AND SURROUNDING LOCALITY

2.1 LOCAL AND REGIONAL CONTEXT

The Shoalhaven Starches factory complex is situated on various allotments of land on Bolong Road, Bomaderry, within the City of Shoalhaven. The factory site is located on the southern side of Bolong Road on the northern bank of the Shoalhaven River. The Shoalhaven Starches site (excluding the former Dairy Farmers site) has an area of approximately 12.5 hectares. The existing Flour Mill building, to which alterations are proposed, is situated on the southern side of the factory site on Lot 1, DP 838753 at 160 Bolong Road. **Figure 1** is a site locality plan.

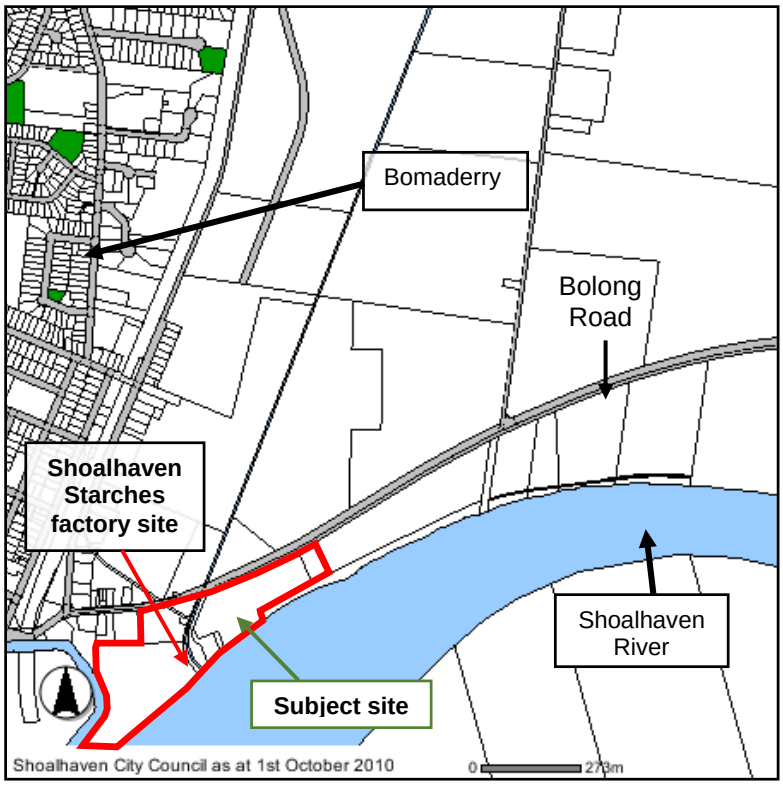

Figure 1: Site Locality Plan.

The town of Bomaderry is located 0.5 km (approx.) to the west of the factory site, and the Nowra urban area is situated 2.0 km to the south west of the site. The "Riverview Road" area of the Nowra Township is situated approximately 1000 metres immediately opposite the factory site across the Shoalhaven River.

The village of Terara is situated approximately 1.5 kilometres to the south east of the site, across the Shoalhaven River. Burraga (Pig) Island is situated between the factory site and the village of Terara and is currently used for dairy cattle grazing.

There are a number of industrial land uses which have developed on the strip of land between Bolong Road and the Shoalhaven River. Industrial activities include a metal fabrication factory, the Shoalhaven Starches site and the former Shoalhaven Paper Mill (Australian Papers). The industrial area is serviced by a privately owned spur railway line that runs from just north of the Nowra-Bomaderry station to the starches plant.

The state railway terminates at Bomaderry with a separate, privately owned spur line to the factory site. Shoalhaven City Council sewerage treatment works is situated between the railway line and the factory.

The Company also carries out irrigation activities on the Company's Environmental Farm located over 1000 hectares on the northern side of Bolong Road. This area is cleared grazing land and also contains spray irrigation lines and wet weather storage ponds). These wet weather storage ponds on the farm form part of the irrigation management system for the factory. The Environmental Farm stretches over a broad area of the northern floodplain of the Shoalhaven River stretching from Bolong Road in the south towards Jaspers Brush in the north. Apart from the Environmental Farm this broad area is mainly used for grazing (dairy cattle).

Figure 2 is an aerial photograph of the site. The existing Flour Mill is housed in a building within proximity of the southern boundary of the factory (see **Figure 2**). The property has direct road frontage to Bolong Road to the north. The Shoalhaven River flows along the southern boundary of the factory site.

Figure 2: Aerial photograph of the factory site.

3.0 BACKGROUND

3.1 PRODUCTION PROCESSES

The production process at the Shoalhaven Starches plant has developed over a number of years. Originally the plant was primarily concerned with the production of starch and gluten from flour. However the Company has pursued a number of technological innovations particularly with respect to reducing the environmental impacts of the Company's operations. As a result Shoalhaven Starches has been moving towards a "closed" system of production. Essentially this entails the efficient use of end products to ensure wastage is reduced to a minimum.

The first step in the production process is the delivery of flour and grain, by rail, from the Company's flour mills at Manildra, Gunnedah and Narrandera. The trainloads are brought into the plant via the switching yard at Bomaderry.

The Company received approval from the Minister for Planning for the erection of a flour mill on site to enable the milling of part of the Company's flour requirements to be processed directly on the site. This Flour Mill has now been commissioned. The remainder of the Company's flour requirement is sourced from the Company's off-site flour mills.

Flour is transferred via storage to the "wet end" of the plant where fresh water is added. The subsequent mixing and separation process produces starch and gluten.

The gluten is dried to enable it to be packaged and distributed as a high protein food additive for human consumption. This product is then taken from the site after packaging for both local and export markets. Starch is used for fermentation and distillation to produce ethanol.

The starch that is separated from the flour is either dried or remains in liquid form. The dried and liquid starch is sold to the paper and food industries. The starch is used for food, cardboard, paper and other industrial purposes. Liquid starch is used in the ethanol production process.

Starch is also used in the production of syrups on the site. The syrups plant products include glucose and brewer's syrup. These are used for foods, chocolates, confectionery, beer, soft drinks and fruit juice. The syrups plant products can also be used in the ethanol process.

The products from the starch, gluten and syrup production processes are combined to feed the fermentation and distillation stage of ethanol production. The outputs are fuel

and industrial grade ethanol. Industrial grade ethanol is used in producing pharmaceuticals, printer's ink and methylated spirits.

Ethanol production results in some liquid and solid by-products, which are processed through the stillage recovery process plant (which was approved as part of PRP No. 7 in 2005). The solids in the stillage are recovered as DDGS (Dried Distillers Grains Syrup), dried and sold as a high protein cattle feed with the remaining water used for irrigation. The waste water resulting from the ethanol production is treated in the wastewater treatment plant and is re-used in the Starch Plant and the surplus is irrigated onto Shoalhaven Starches Environmental Farm to the north of Bolong Road. This farm land is used for fodder crops, pasture and cattle grazing.

3.2 OPERATING WORKFORCE

3.2.1 Operations

The existing factory operates 24 hours per day, 7 days a week, 365 days of the year.

3.2.2 Workforce

The plant employs a total of 280 staff, covering all components of production - operators, administrative personnel and maintenance staff. Employee breakdown and hours of shifts are as follows:

A total of around 280 employees	Management, Technical & Administration	60
	Day Workers	75
	Shift Production (spread over 4 shifts)	145

Hours of Shifts

Plant:	6:00 am to 6:00 pm	- 88 employees	
	6:00 pm to 6:00 am	- 88 employees	
	Day – 7:00 am to 3:00 pm but variable		75 employees, 60 Management, Technical & Administration
Farm:	5:00 am to 5:00 pm	- 3 employees	
	5:00 pm to 5:00 am	- 3 employees	
	7:00 am to 3:00 pm	- 3 employees	

Shift work at both the factory and farm is undertaken on a continuous roster basis.

3.3 RAW MATERIALS

Raw material and energy components used in the Shoalhaven Starches processes are flour, grain for ethanol product and wheat for milling; coal, natural gas, fresh water and salt water.

Flour is delivered to the site by rail from the Company's mills at Manildra, Gunnedah and Narrandera each day of the week. The flour arrives into the plant by Company owned and hired stainless steel rail wagons. From the silos, the flour is moved into the plant by air as required. The approved flour consumption of the plant is 20,000 tonnes per week.

Grain is delivered to the site by rail. The approved grain consumption is currently 6650 tonnes per week. The grain is used in the production of ethanol and DDG. The grain is "dumped" from the train into an underground hopper and conveyed by screw conveyors and bucket elevator into a silo.

3.4 DEVELOPMENT AND APPROVAL HISTORY

3.4.1 Development History of Site Prior to Project Approval MP 06_0228

The Shoalhaven Starches wheat starch and gluten plant at Nowra was originally constructed in 1970. The Manildra flour mills, at Manildra, Narrandera and Gunnedah, supply the Shoalhaven Starches factory, which currently produces wheat starch, gluten, syrups and ethanol (industrial and fuel grades). The Shoalhaven Starches operation provides direct on-site employment for 280 employees. Through the use of contractors it also indirectly creates employment for many more people in the local and regional economies.

In order to address the issue of waste water disposal, in 1984 Shoalhaven Starches installed a spray irrigation system, using farmland it owned on the northern side of Bolong Road at Bomaderry.

In June 1991, two storage ponds were built (Ponds No. 1 and 2) resulting in the cessation of waste water discharge to the Shoalhaven River.

To further reduce product wastage, Shoalhaven Starches sought to use excess starch for the production of ethanol. Ethanol production began at the Shoalhaven site in June 1992.

In 1994, the NSW Government approved the installation of a larger ethanol distillery within the existing site. The new distillery and its associated facilities enabled production of ethanol to increase from 20 million litres per annum to a production capacity of 100 million litres per year.

Subsequent to this approval Shoalhaven City Council issued development consent for:

- a protein isolate plant and DDGS Dryer; and
- a sorghum grinding plant.

Shoalhaven City Council issued development approval for the construction of a wet weather storage pond (Pond No. 6) on the 27th April 2001. At present, with the completion of Pond No. 6, Shoalhaven Starches has a combined waste water storage capacity within the existing ponds of 925 ML. A further wet weather storage pond (Pond No. 7) was approved by the Minister for Planning on the 23 December 2002 and subsequently modified by the approval by the Minister for Planning to form the anaerobic and aerobic parts of the wastewater treatment plant.

On the 1st June, 2001 the Minister for Urban Affairs & Planning, Dr Andrew Refshauge MP, declared both the Shoalhaven Starches factory and Environmental Farm as being State Significant Development for the purposes of the then Section 76A(7) of the Environmental Planning & Assessment Act.

In 2003 the Minister for Planning issued development consent (D223) for Shoalhaven Starches Pollution Reduction Program (PRP) No. 7. This approval enabled the implementation of the Company's Waste Water Management Strategy, and essentially sought to remove solids (suspended and soluble) from the Company's waste water, prior to its irrigation on the Environmental Farm.

This process, known as Stillage Recovery (to be further discussed in Section 3.1 of this report), essentially involved the; introduction of additional decanters; installation of an evaporation plant; and additional dryers, to remove solids from the waste water. It is the remaining solids in the waste water that when sprayed onto the Environmental Farm, or stored in the wet weather storage ponds, which had the potential to result in the generation of odours.

The recovery of the suspended and soluble solids from the waste water could not be undertaken by the dryers in this process, without firstly providing additional coarse solids. Additional coarse solids (grain) were required to be imported to the site.

As a consequence of the additional grain, the starch contained in the grain resulted in a need to increase ethanol production to 126 million litres per year. This increase in ethanol production required the installation of additional fermenters, associated cooling towers and molecular sieves.

The increase in ethanol production also resulted in an increase in waste water, which was required to be disposed on the environmental farm. In this regard this previous proposal also included an increase in waste water disposal area on the Environmental Farm.

The plant associated with this previous approval has now been substantially installed and commissioned.

Shoalhaven Starches have subsequently received the following development approvals:

- The establishment of a flour mill on the factory site. On the 4th October 2007 the then Minister for Planning granted Project Approval P 07_0021 for a Flour Mill at the factory site. This proposal provides for the transportation of wheat directly to the site by train for processing into industrial grade flour for the use in the production of starch and gluten at the factory site. This Modification Application seeks approval to undertake alterations to this existing Flour Mill.
- An application pursuant to Section 96 of the Environmental Planning & Assessment Act seeking to modify the development approval for the PRP No. 7 project to enable a DDGS Dryer to be installed in a slightly different location in the same building as previously approved; and the installation of an additional evaporator (a redundant piece of equipment located at the Company's Altona Plant in Victoria) to provide standby capacity for the existing evaporator plant when sections of the existing plant are out of service or cleaning.
- A Section 96 modification application for a standby fermenter tank to be installed on the site, to enable the existing fermenter tanks to be taken out of service for maintenance one at a time.

A full list of all approvals that apply to the Shoalhaven Starches site are detailed within Section 3.4 of the EA prepared by our firm, in relation to the Shoalhaven Starches Expansion Project (MP 06_0228).

3.4.2 Project Approval MP 06_0228

On the 28th January 2009 the then Minister for Planning, issued Project Approval MP 06_0228 for the Shoalhaven Starches Expansion Project.

The primary objective of the Shoalhaven Starches Expansion Project was to increase the Company's ethanol production capacity to meet the expected increase in demand for ethanol primarily, arising from the NSW Government's mandate to increase ethanol content by volume in petrol in NSW from 2% to 6% from October 2011, by upgrading the existing ethanol plant.

The approval will, subject to certain conditions, enable Shoalhaven Starches to increase ethanol production in a staged manner at its Bomaderry Plant from 126 million litres per year to 300 million litres per year.

To accomplish the increase in ethanol production, the Project Approval enabled Shoalhaven Starches to upgrade plant and increase throughput of raw materials, principally comprising flour and grain.

The following additions and alterations have been approved to the existing factory site as part of this Project Approval:

- the provision of an additional dryer for the starch/gluten plant;
- additional equipment and storage vessels for the ethanol plant including 3 additional fermenters, additional cooling towers and molecular sieves;
- upgrades to the Stillage Recovery Plant including 6 additional Dried Distillers Grains Syrup (DDGS) dryers; 10 decanters; chemical storage and two evaporators. The proposal includes the installation of a DDGS Pelletiser Plant within this part of the site; and,
- the establishment of a new packing plant, container loading area and a rail spur line. The establishment of this facility on the northern side of Bolong Road will require the provision of an overhead bridge structure to allow product and safe pedestrian movement across Bolong Road.

In addition, as part of the Project Approval, Shoalhaven Starches will undertake comprehensive odour reduction measures for both the existing factory site and the works associated with the Expansion Project. In 2006, the Land and Environment Court required Shoalhaven Starches to engage a suitably qualified person to conduct a comprehensive environmental audit of the factory and Environmental Farm. This environmental audit was undertaken GHD Pty Ltd. The audit report includes a number of recommendations for the implementation of works to the existing site, some of which require development approval. These works were included within this Project Approval.

The Project Approval enables a staged implementation of the expansion project. Up to 200 million litres of ethanol will be able to be produced at the Bomaderry Plant and eventually increased up to 300 million litres.

The Project Approval also enables the biological treatment of waste waters from the factory site and the re-use of over half the treated waste water within the factory processes, with the remainder irrigated onto the Company's Environmental Farm.

The Project Approval also consolidated all previous approvals including Project Approval P 07_0021 (the Flour Mill) into the one Project Approval.

3.4.3 Approval History Following MP 06_0228

DA 10/1843 – Upgrade Vehicle Entrance (Former Dairy Farmers Factory Site)

Project Approval MP 06_0228 required vehicle access points to the Bomaderry site to be upgraded to the satisfaction of Council and the RMS.

The subsequent upgrading works included the construction of a concrete median along the centre of Bolong Road to the east of Abernethy's drain in such a manner that prevented vehicles travelling east along Bolong Road turning right into the central vehicle access point to the Shoalhaven Starches site and prevented vehicles turning right out from this access point and travelling east along Bolong Road.

These works also prevented vehicles turning right out from the BOC Carbon Dioxide Plan located opposite the Shoalhaven Starches site.

Shoalhaven Starches therefore sought approval from Shoalhaven City Council to upgrade the former Dairy Farmers site vehicular access and relocate the access to enable vehicles to enter Access Point 2 from the east. These works would also allow vehicles wishing to travel west from BOC Carbon Dioxide Plant to leave this site to first travel east; by allowing vehicles to travel to the former Dairy Farmers Factory Complex and using the upgraded access to turn around before travelling west along Bolong Road.

RA 11/1002 Interim Packing Plant

Following Project Approval MP 06_0228 Shoalhaven Starches also obtained a separate development approval to use an existing factory building located at 22 Bolong Road (Lot 21 DP 100265) as an Interim Packing Plant from Shoalhaven City Council (RA 11/1002 dated 26th October 2011). This Interim Packing Plant operates in conjunction with the Company's existing Packing Plant which is located within the existing factory site.

As outlined in Section 3.4, Project Approval MP 06_0228 made provision for a new Packing Plant to be located on land owned by the company on the northern side of Bolong Road.

Following the granting of MP 06_0228 however the Manildra Group of Companies acquired the former Dairy Farmers factory site located at 220 Bolong Road. The Company has therefore been reconsidering the best location for the future Packing Plant.

In the interim period however the Flour Mill and a new starch dryer were commissioned resulting in a subsequent increase in production of dried product from these new plants.

Interim Packing Plant facilities were therefore required until the final location for the new packing plant is determined. It is intended that the Interim Packing Plant would operate on a temporary basis until a final location for the new Packing Plant is identified.

Shoalhaven Starches have held initial consultation with the Department of Planning & Environment with respect to submitting a separate modification application which will seek to relocate the approved Packing Plant (and dryer). Shoalhaven Starches are currently reviewing options for the final packing plant location. Once the new Packing Plant has been constructed, the need for the Interim Packing Plant will be reviewed.

DA 11/1855 – Widening of Driveway

A further development application (DA 11/1855) was submitted to Shoalhaven City Council on the 4th August 2011 seeking approval to widen the driveways serving 22 Bolong Road Bomaderry (ie. the site of the Interim Packing Plant) to accommodate semi-trailers. This development application was approved by Shoalhaven City Council on the 24th August 2011.

DA 13/1713 – Demolition of Dimethyl Ether Plant

On the 5th July 2013 Shoalhaven Starches submitted a development application to Shoalhaven City Council seeking the demolition of a Dimethyl Ether Plant on the site. This development application was approved by Shoalhaven City Council on the 15th July 2013.

DA 14/2161 – Additional Two (2) Grain Silos

On the 19th September 2014 Shoalhaven Starches submitted a development application to Shoalhaven City Council seeking development consent to erect two additional grain silos on the factory site within the vicinity of the existing Flour Mill. The purpose of these two additional grain silos will be to provide security of raw material storage and supply when there are closures of the Illawarra rail line serving the Shoalhaven Starches site enabling the factory operations to continue during rail line closures. Over recent years there have been occasions when there have been closures of the Illawarra rail line due to track construction work as well as a result of floods, storms and traffic accidents. During these closures the supply of grain and flour to the Shoalhaven Starches site has been interrupted. The additional grain silos associated with this application will provide a buffer for on-site storage and additional security of storage and supply should closures to the rail line occur in the future.

Other Approvals

There have been other approvals that have been issued by Shoalhaven City Council that are located on land associated with Shoalhaven Starches operations, but which do not directly relate to the operations of Shoalhaven Starches including:

- DA 11/1936 – Algae Demonstration Plant for evaluation of algae production and processing for alternative fuel and CO_2 sequestration. Proponent – Algae Tec Pty Ltd at 220 Bolong Road (former Dairy Farmers factory site).
- DA 14/1327 – Alterations to existing building (former Dairy Farmers Factory Building) and re-use as a meat processing plant. Proponent – Candal Investments Pty Ltd at 220 Bolong Road (former Dairy Farmers factory site).

4.0 STATUTORY SITUATION

4.1 PART 3A OF THE EP&A ACT

The introduction of Part 3A to the Environmental Planning & Assessment Act 1979, and the introduction of *State Environmental Planning Policy (Major Development)* in 2005, brought about a change in the regime concerning the assessment of state significant development. Part 3A initially targeted the streamlining of the assessment of projects deemed to be of state significance, including critical infrastructure projects.

Following the 2011 election, the NSW Government implemented measures seeking to change the planning legislative and policy regime applicable to projects previously subject to Part 3A.

Under these legislation changes no new applications for any of the development that was previously identified as Part 3A in the Major Development SEPP will be accepted and assessed during this interim period.

The NSW Parliament subsequently passed amendments to the *Environmental Planning & Assessment Act 1979* (the EP&A Act). These amendments created an alternative assessment system which allows the NSW Government to assess and determine projects which are of State significance.

The amended EP&A Act establishes two separate assessment frameworks for either State Significant Infrastructure (SSI) or State Significant Development (SSD). Projects that fall under these two categories will be assessed by the Department of Planning and Infrastructure (the 'Department').

To this end, the Act largely returns to the situation before Part 3A where two separate assessment pathways were in place for projects to be assessed by the State, namely

- Linear public infrastructure projects such as railways, water supply systems, pipelines and transmission lines, or other development by a State agency which has a significant environmental effect; and
- Significant development types which require consent such as mines, chemical and manufacturing plants, warehousing and distribution facilities, hospitals and associated ancillary development.

The Act also introduces a number of changes to the operation and make-up of the Planning Assessment Commission (PAC) and Joint Regional Planning Panels (Regional Panels), seeking to provide additional transparency and greater local government input.

Supporting regulations and an associated new State Environmental Planning Policy (SEPP) have been introduced and come into effect from the 1st October 2011. These supporting provisions provide additional detail with respect to the classes and thresholds for development to be considered as State Significant.

This new SEPP is called *State Environmental Planning Policy (State and Regional Development) 2011* and is known as the "State and Regional Development SEPP". This new SEPP approximately halves the number of proposals dealt with by the State when compared with the former Part 3A system.

The *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) has also been amended to update a number of procedural and administrative arrangements.

This is an interim assessment system which will be reviewed as part of the proposed overall review of the NSW planning system that the new NSW Government has also instigated.

The approved Shoalhaven Starches Expansion Project however is termed a *Transitional Part 3A Project* under the amended EP&A legislation.

These circumstances are clarified in Planning Circular PS 11-021 issued by the Department of Planning & Infrastructure on the 30th September 2011. This Circular confirms that Part 3A continues to apply to certain projects subject to transitional provisions identified in Schedule 6A of the Act.

Schedule 6A of the *EP&A Act* makes provisions for such projects. Essentially a *Transitional Part 3A Project* includes:

> *(a) an approved project (whether approved before or after the repeal of Part 3A),*
>
> *(b) a project for which environmental assessment requirements were notified or adopted before the repeal of Part 3A,*
>
> *(c) a project that is the subject of a Part 3A project application and that the regulations declare to be a transitional Part 3A project.*

As the Shoalhaven Starches Expansion Project was approved on the 28th January 2009 this project is considered a *Transitional 3A Project* for the purposes of this legislation.

Clause 3 of Schedule 6A provides for the continuation of Part 3A and Transitional Part 3A projects. Essentially it states that Part 3A continues to apply to and in respect of *Transitional Part 3A* projects. Clause 3 reads:

3 Continuation of Part 3A – transitional Part 3A projects

(1) Part 3A continues to apply to and in respect of a transitional Part 3A project.

(2) For that purpose:

(a) any State environmental planning policy or other instrument made under Part 3A, as in force on the repeal of that Part and as amended after that repeal, continues to apply to and in respect of a transitional Part 3A project, and

(b) declarations, orders, directions, determinations or other decisions with respect to a transitional Part 3A project continue to have effect and may continue to be made under Part 3A (including for the purpose of the application or continued application of Part 4 or 5 or other provisions of this Act in relation to the project).

(3) The regulations may modify provisions of Part 3A (and the instruments or decisions referred to in subclause (2)) as they apply to a transitional Part 3A project.

(4) The declaration of development as a project under Part 3A (or as a critical infrastructure project) is revoked if the development is not, or ceases to be, a transitional Part 3A project.

(5) A transitional Part 3A project is not State significant development or State significant infrastructure.

(6) This clause is subject to the other provisions of this Schedule.

Given these circumstances Part 3A will continue to apply for the proposed Shoalhaven Starches Expansion Project.

Part 3A continues to apply to the Shoalhaven Starches Expansion Project. State Environmental Planning Policy (Major Projects) continues to support Part 3A of the Act.

Section 75W of the Environmental Planning & Assessment Act makes provision for the modification of Major Projects to which Part 3A applied and continues to apply.

4.2 SECTION 75W AND MODIFICATION PROPOSALS

Section 75W of the EPA Act relates to modifications to approvals issued by the Minister for Planning and states:

75W Modification of Minister's approval

(1) In this section:

***Minister's approval** means an approval to carry out a project under this Part, and includes an approval of a concept plan.*

modification of approval *means changing the terms of a Minister's approval, including:*

(a) revoking or varying a condition of the approval or imposing an additional condition of the approval, and

(b) changing the terms of any determination made by the Minister under Division 3 in connection with the approval.

(2) The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.

(3) The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.

(4) The Minister may modify the approval (with or without conditions) or disapprove of the modification.

(5) The proponent of a project to which section 75K applies who is dissatisfied with the determination of a request under this section with respect to the project (or with the failure of the Minister to determine the request within 40 days after it is made) may, within the time prescribed by the regulations, appeal to the Court. The Court may determine any such appeal.

(6) Subsection (5) does not apply to a request to modify:

(a) an approval granted by or as directed by the Court on appeal, or

(b) a determination made by the Minister under Division 3 in connection with the approval of a concept plan.

(7) This section does not limit the circumstances in which the Minister may modify a determination made by the Minister under Division 3 in connection with the approval of a concept plan.

This application is made pursuant to Section 75W of the EPA Act.

4.3 LOCAL PLANNING PROVISIONS

Shoalhaven Local Environmental Plan (SLEP) 2014

The site is zoned IN1 (General Industrial) zone under the provisions of SLEP 2014 (refer **Figure 3**). The objectives of the IN1 zone are:

- *To provide a wide range of industrial and warehouse land uses.*
- *To encourage employment opportunities.*
- *To minimise any adverse effect of industry on other land uses.*
- *To support and protect industrial land for industrial uses.*

- *To allow a diversity of activities that do not significantly conflict with the operation of existing or proposed development.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area.*

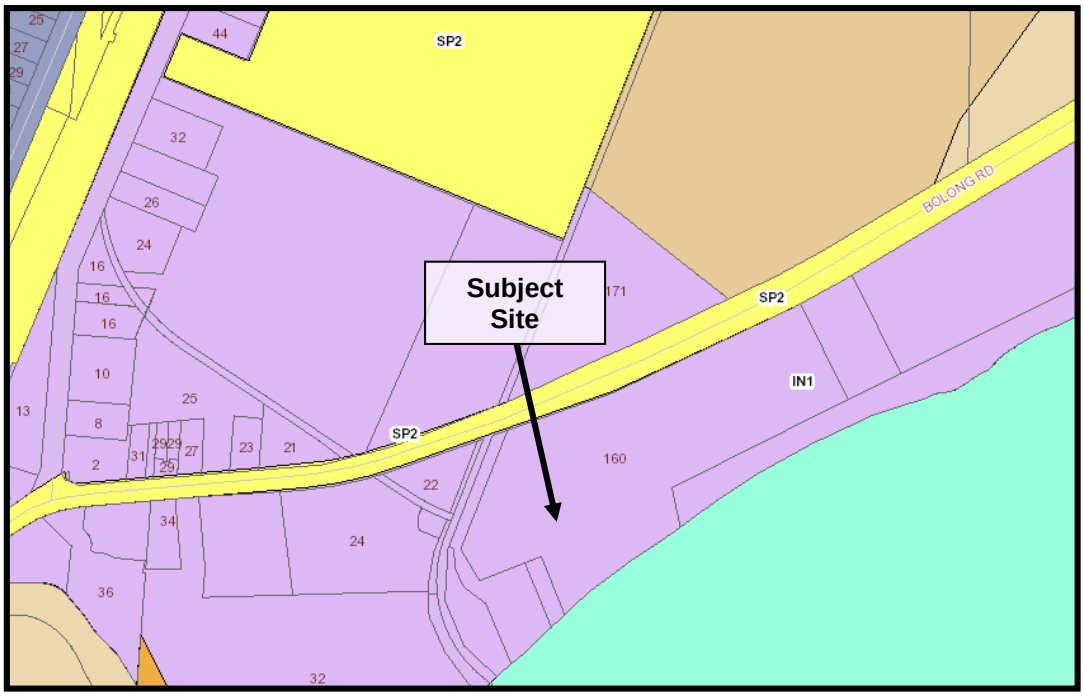

Figure 3: Zoning provisions applying under Shoalhaven LEP 2014.

It is our view that the proposal is consistent with these objectives as the proposal involves alterations and additions to an existing industrial activity. Furthermore the proposal includes measures to minimise the effects of the proposal.

Industry is a permissible use within this zone. The proposal is permissible subject to Council's consent (see **Table 1** below).

Table 1

Land Use Permissibility – IN1 Zone (Shoalhaven LEP 2014)

Permitted without consent	Nil.
Permitted with consent	Bulky goods premises; Depots; Freight transport facilities; **General industries**; Industrial training facilities; Kiosks; Light industries; Markets; Neighbourhood shops; Roads; Take away food and drink premises; Timber yards; Warehouse or distribution centres
Prohibited	Agriculture; Air transport facilities; Airstrips; Amusement centres; Animal boarding or training establishments; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Child care centres; Correctional centres; Crematoria; Eco-tourist facilities; Educational establishments;

Table 1 continued

Prohibited continued	Environmental facilities; Exhibition villages; Extractive industries; Farm buildings; Forestry; Function centres; Health services facilities; Highway service centres; Home-based childcare; Home businesses; Home occupations; Home occupations (sex services); Information and education facilities; Marinas; Mooring pens; Moorings; Office premises; Open cut mining; Places of public worship; Registered clubs; Residential accommodation; Respite day care centres; Restricted premises; Retail premises; Sex services premises; Tourist and visitor accommodation; Water recreation structures; Wharf or boating facilities.

The SLEP 2014 also has a number of specific provisions that apply to the land. The implications that these provisions have in relation to this proposal are discussed in **Table 2** below:

Table 2
Shoalhaven LEP 2014 Provisions

SLEP 2014 Clause	***Provisions***	***Comments***
4.3 Height of Buildings	*(1) The objectives of this clause are as follows:* *(a) to ensure that buildings are compatible with the height, bulk and scale of the existing and desired future character of a locality,* *(b) to minimise visual impact, disruption of views, loss of privacy and loss of solar access to existing development,* *(c) to ensure that the height of buildings on or in the vicinity of a heritage item or within a heritage conservation area respect heritage significance.* *(2) The height of a building on any land is not to exceed the maximum height shown for the land on the Height of Buildings Map.* *(2A) If the Height of Buildings Map does not show a maximum height for any land, the height of a building on the land is not to exceed 11 metres.*	The existing Flour Mill has a height of 32.05m. The proposal involves new equipment that will be housed largely within the confines of the existing Flour Mill building footprint only; no significant external additions to the existing building footprint are necessary, except for a minor extension between the silos and Flour Mill building. The proposal will involve additional plant being located on top of the existing building. The proposal will result in the overall height of the Flour Mill facility increasing in height to 40 m (involving only the proposed external extension). Although there is no maximum height specified for the subject land part (2a) of Clause 4.3 of SLEP 2014 states no building is to be in excess of 11 metres. As such a submission for an exception to development standards under Clause 4.6 of the SLEP 2014 has been prepared and is attached under **Annexure 3**.

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
4.6 Exceptions to development standards	*(1) The objectives of this clause are as follows:* *(a) to provide an appropriate degree of flexibility in applying certain development standards to particular development,* *(b) to achieve better outcomes for and from development by allowing flexibility in particular circumstances.* *(2) Development consent may, subject to this clause, be granted for development even though the development would contravene a development standard imposed by this or any other environmental planning instrument.* *However, this clause does not apply to a development standard that is expressly excluded from the operation of this clause.* *(3) Development consent must not be granted for development that contravenes a development standard unless the consent authority has considered a written request from the applicant that seeks to justify the contravention of the development standard by demonstrating:* *(a) that compliance with the development standard is unreasonable or unnecessary in the circumstances of the case, and* *(b) that there are sufficient environmental planning grounds to justify contravening the development standard.* *(4) Development consent must not be granted for development that contravenes a development standard unless:* *(a) the consent authority is satisfied that:* *(i) the applicant's written request has adequately addressed the matters required to be demonstrated by subclause (3), and* *(ii) the proposed development will be in the public interest because it is consistent with the objectives of the particular standard and the objectives for development within the zone in which the development is proposed to be carried out, and* *(b) the concurrence of the Director-General has been obtained.* *(5) In deciding whether to grant concurrence, the Director-General must consider:*	The height of the proposed alterations to the existing Flour Mill exceeds the 11 metre maximum as specified in (2A) of Clause 4.3 Height of Buildings of the SLEP 2014. As outlined above the proposal will result in an increase in height of part of the Flour Mill facility to 40 m (comprising only the proposed external extension). The existing facility has a building height of 32.05 m. Given the nature and scale of the proposal, and as the proposed alterations to the existing Flour Mill will be located within the existing industrial complex, it is not expected that the new development will have an undue effect due to its height. A submission for an exception to development standards has been prepared and is attached to the SEE under **Annexure 3**.

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
4.6 continued	*(a) whether contravention of the development standard raises any matter of significance for State or regional environmental planning, and* *(b) the public benefit of maintaining the development standard, and* *(c) any other matters required to be taken into consideration by the Director-General before granting concurrence.* *(6) Development consent must not be granted under this clause for a subdivision of land in Zone RU1 Primary Production, Zone RU2 Rural Landscape, Zone RU3 Forestry, Zone RU4 Primary Production Small Lots, Zone RU6 Transition, Zone R5 Large Lot Residential, Zone E2 Environmental Conservation, Zone E3 Environmental Management or Zone E4 Environmental Living if:* *(a) the subdivision will result in 2 or more lots of less than the minimum area specified for such lots by a development standard, or* *(b) the subdivision will result in at least one lot that is less than 90% of the minimum area specified for such a lot by a development standard.* *Note. When this Plan was made it did not include all of these zones.* *(7) After determining a development application made pursuant to this clause, the consent authority must keep a record of its assessment of the factors required to be addressed in the applicant's written request referred to in subclause (3).* *(8) This clause does not allow development consent to be granted for development that would contravene any of the following:* *(a) a development standard for complying development,* *(b) a development standard that arises, under the regulations under the Act, in connection with a commitment set out in a BASIX certificate for a building to which State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 applies or for the land on which such a building is situated,* *(c) clause 5.4,* *(ca) clause 6.1 or 6.2*	

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
5.5 Development within the coastal zone	*(1) The objectives of this clause are as follows:* *(a) to provide for the protection of the coastal environment of the State for the benefit of both present and future generations through promoting the principles of ecologically sustainable development,* *(b) to implement the principles in the NSW Coastal Policy, and in particular to:* *(i) protect, enhance, maintain and restore the coastal environment, its associated ecosystems, ecological processes and biological diversity and its water quality, and* *(ii) protect and preserve the natural, cultural, recreational and economic attributes of the NSW coast, and* *(iii) provide opportunities for pedestrian public access to and along the coastal foreshore, and* *(iv) recognise and accommodate coastal processes and climate change, and* *(v) protect amenity and scenic quality, and* *(vi) protect and preserve rock platforms, beach environments and beach amenity, and* *(vii) protect and preserve native coastal vegetation, and* *(viii) protect and preserve the marine environment, and* *(ix) ensure that the type, bulk, scale and size of development is appropriate for the location and protects and improves the natural scenic quality of the surrounding area, and* *(x) ensure that decisions in relation to new development consider the broader and cumulative impacts on the catchment, and* *(xi) protect Aboriginal cultural places, values and customs, and* *(xii) protect and preserve items of heritage, archaeological or historical significance* *(2) Development consent must not be granted to development on land that is wholly or partly within the coastal zone unless the consent authority has considered:*	The subject land is located within the coastal zone. The proposal is not considered to adversely affect the coastal zone based on the following: • The proposal does not affect or impinge on public access to or along the coastal foreshore. • The proposed development is situated adjacent to existing industrial development and will not significantly alter the building footprint of the existing Flour Mill. • The proposal is considered to be suitable development given its type, location and design. The development is also consistent with the zoning objectives for the land. • The development will not lead to overshadowing of foreshore areas. The site is situated on the northern side of the Shoalhaven River. • The scenic qualities of the area will not diminish. Visual impact is further addressed in Section 8.5 of this EA. • The proposal will not lead to adverse impacts on threatened fauna and flora.

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
5.5 continued	*(a) existing public access to and along the coastal foreshore for pedestrians (including persons with a disability) with a view to:* *(i) maintaining existing public access and, where possible, improving that access, and* *(ii) identifying opportunities for new public access, and* *(b) the suitability of the proposed development, its relationship with the surrounding area and its impact on the natural scenic quality, taking into account:* *(i) the type of the proposed development and any associated land uses or activities (including compatibility of any land-based and water-based coastal activities), and* *(ii) the location, and* *(iii) the bulk, scale, size and overall built form design of any building or work involved, and* *(c) the impact of the proposed development on the amenity of the coastal foreshore including:* *(i) any significant overshadowing of the coastal foreshore, and* *(ii) any loss of views from a public place to the coastal foreshore, and* *(d) how the visual amenity and scenic qualities of the coast, including coastal headlands, can be protected, and* *(e) how biodiversity and ecosystems, including:* *(i) native coastal vegetation and existing wildlife corridors, and* *(ii) rock platforms, and* *(iii) water quality of coastal waterbodies, and* *(iv) native fauna and native flora, and their habitats, can be conserved, and* *(f) the cumulative impacts of the proposed development and other development on the coastal catchment.*	

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
5.5 continued	*(3) Development consent must not be granted to development on land that is wholly or partly within the coastal zone unless the consent authority is satisfied that:* *(a) the proposed development will not impede or diminish, where practicable, the physical, land-based right of access of the public to or along the coastal foreshore, and* *(b) if effluent from the development is disposed of by a non-reticulated system, it will not have a negative effect on the water quality of the sea, or any beach, estuary, coastal lake, coastal creek or other similar body of water, or a rock platform, and* *(c) the proposed development will not discharge untreated stormwater into the sea, or any beach, estuary, coastal lake, coastal creek or other similar body of water, or a rock platform, and* *(d) the proposed development will not:* *(i) be significantly affected by coastal hazards, or* *(ii) have a significant impact on coastal hazards, or* *(iii) increase the risk of coastal hazards in relation to any other land.*	
5.10 Heritage Conservation	*(1) The objectives of this clause are:* *(a) to conserve the environmental heritage of Shoalhaven; and* *(b) to conserve the heritage significance of heritage items and heritage conservation areas including associated fabric, settings and views; and* *(c) to conserve archaeological sites; and* *(d) to conserve Aboriginal objects and Aboriginal places of heritage significance.* *(2) Development consent is required for any of the following:* *(a) demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):* *(i) a heritage item,* *(ii) an Aboriginal object*	There are no heritage items within the subject land. And the subject site is not located within a heritage conservation area.

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
5.10 continued	*(iii) a building, work, relic or tree within a heritage conservation area,* *(b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,* *(c) disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,* *(d) disturbing or excavating an Aboriginal place of heritage significance,* *(e) erecting a building on land:* *(i) on which a heritage item is located or that is within a heritage conservation area;* *(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,* *(f) subdividing land:* *(i) on which a heritage item is located or that is within a heritage conservation area, or* *(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.*	
7.1 Acid sulfate soils	*(1) The objective of this clause is to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage.* *(2) Development consent is required for the carrying out of works described in the Table to this subclause on land shown on the Acid Sulfate Soils Map as being of the class specified for those works, except as provided by this clause.*	Mapping supporting the SLEP 2013 identifies the subject land as being affected by Class 3 and 4 land. The proposal involves new equipment that will be housed largely within the confines of the existing Flour Mill building footprint only; no significant external additions to the existing building footprint are necessary.

Table 2 (continued)

<table>
<tr><th>SLEP 2014 Clause</th><th>Provisions</th><th>Comments</th></tr>
<tr><td>7.1 continued</td><td>
<table>
<tr><th>Class of Land</th><th>Works</th></tr>
<tr><td>1</td><td>Any works.</td></tr>
<tr><td>2</td><td>Works below the natural ground surface.
Works by which the watertable is likely to be lowered.</td></tr>
<tr><td>3</td><td>Works more than 1 metre below the natural ground surface.
Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.</td></tr>
<tr><td>4</td><td>Works more than 2 metres below the natural ground surface.
Works by which the watertable is likely to be lowered more than 2 metres below the natural ground surface.</td></tr>
<tr><td>5</td><td>Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.</td></tr>
</table>
(3) Development consent must not be granted under this clause for the carrying out of works unless an acid sulfate soils management plan has been prepared for the proposed works in accordance with the Acid Sulfate Soils Manual and has been provided to the consent authority.
(4) Despite subclause (2), development consent is not required under this clause for the carrying out of works if:
(a) a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual indicates that an acid sulfate soils management plan is not required for the works, and
(b) the preliminary assessment has been provided to the consent authority and the consent authority has confirmed the assessment by notice in writing to the person proposing to carry out the works.
</td><td>The proposal will not involve any excavations or earthworks.
Under these circumstances the provisions of this clause have no further consequence for the proposal.</td></tr>
</table>

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
7.1 continued	*(5) Despite subclause (2), development consent is not required under this clause for the carrying out of any of the following works by a public authority (including ancillary work such as excavation, construction of access ways or the supply of power):* *(a) emergency work, being the repair of the works of the public authority required to be carried out urgently because the works have been damaged, have ceased to function or pose a risk to the environment or to public health and safety,* *(b) routine management work, being the periodic inspection, cleaning, repair or replacement of the works of the public authority (other than work that involves the disturbance of more than 1 tonne of soil).* *(c) minor work, being work that costs less than $20,000 (other than drainage work).* *(6) Despite subclause (2), development consent is not required under this clause to carry out any works if:* *(a) the works involve the disturbance of less than 1 tonne of soil, and* *(b) the works are not likely to lower the watertable.*	
7.3 Flood Planning	*(1) The objectives of this clause are as follows:* *(a) to minimise the flood risk to life and property associated with the use of land,* *(b) to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change,* *(c) to avoid significant adverse impacts on flood behaviour and the environment.* *(2) This clause applies to:* *(a) land identified as "Flood Planning Area" on the Flood Planning Area Map, and* *(b) other land at or below the flood planning level.* *(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:*	The *Flood Planning Area Map* that accompanies the SLEP 2014 identifies the subject land as being flood prone land. The application is supported by a Flood Impact Assessment undertaken by WMA (**Annexure 4**). This issue is discussed further in Section 8.4 of this EA.

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
7.3 continued	*(a) is compatible with the flood hazard of the land, and* *(b) will not significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and* *(c) incorporates appropriate measures to manage risk to life from flood, and* *(d) will not significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and* *(e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding, and* *(f) will not affect the safe occupation or evacuation of the land.* *(4) A word or expression used in this clause has the same meaning as it has in the Floodplain Development Manual (ISBN 0 7347 5476 0) published by the NSW Government in April 2005, unless it is otherwise defined in this clause.* *(5) In this clause:* ***flood planning level** means the level of a 1:100 ARI (average recurrent interval) flood event plus 0.5 metre freeboard.*	
7.4 Coastal Risk Planning	*(1) The objectives of this clause are as follows:* *(a) to avoid significant adverse impacts from coastal hazards,* *(b) to ensure uses of land identified as coastal risk are compatible with the risks presented by coastal hazards,* *(c) to enable the evacuation of land identified as coastal risk in an emergency,* *(d) to avoid development that increases the severity of coastal hazards.* *(2) This clause applies to the land identified as "Coastal Risk Planning Area" on the Coastal Risk Planning Map.* *(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:* *(a) will avoid, minimise or mitigate exposure to coastal processes, and*	The *Coastal Risk Planning Map* that accompanies the SLEP 2014 does <u>not</u> identify the subject land as a "*Coastal Risk Planning Area"*. The provisions of this clause therefore do not apply to the subject site.

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
7.4 continued	*(b) is not likely to cause detrimental increases in coastal risks to other development or properties, and* *(c) is not likely to alter coastal processes and the impacts of coastal hazards to the detriment of the environment, and* *(d) incorporates appropriate measures to manage risk to life from coastal risks, and* *(e) is likely to avoid or minimise adverse effects from the impact of coastal processes and the exposure to coastal hazards, and* *(f) provides for the relocation, modification or removal of the development to adapt to the impact of coastal processes and coastal hazards, and* *(g) has regard to the impacts of sea level rise.* *(4) A word or expression used in this clause has the same meaning as it has in the NSW Coastal Planning Guideline: Adapting to Sea Level Rise (ISBN 978-1-74263-035-9) published by the NSW Government in August 2010, unless it is otherwise defined in this clause.* *(5) In this clause:* ***coastal hazard** has the same meaning as in the Coastal Protection Act 1979.*	
7.5 Terrestrial Biodiversity	*(1) The objective of this clause is to maintain terrestrial biodiversity, by:* *(a) protecting native flora and fauna,* *(b) protecting the ecological processes necessary for their continued existence, and* *(c) encouraging the recovery of native flora and fauna, and their habitats.* *(2) This clause applies to land:* *(a) identified as "Biodiversity—habitat corridor" or "Biodiversity—significant vegetation" on the Terrestrial Biodiversity Map, and* *(b) situated within 40m of the bank (measured horizontally from the top of the bank) of a natural waterbody.* *(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:*	The *Terrestrial Biodiversity Map* that accompanies the SLEP 2014 does <u>not</u> identify the subject land as including areas of *Biodiversity - habitat corridor* and/or *Biodiversity - significant vegetation*. Given the nature of the site and that the proposal does not alter the footprint of the existing Flour Mill building, the proposal will not have any adverse impacts on the ecological value of the land. There is no vegetation of importance located on the land.

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
7.5 continued	*(a) whether the development is likely to have:* *(i) any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and* *(ii) any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and* *(iii) any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and* *(iv) any adverse impact on the habitat elements providing connectivity on the land, and* *(b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.* *(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:* *(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or* *(b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or* *(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.* *(5) For the purpose of this clause:* ***bank** means the limit of the bed of a natural waterbody.* ***bed,** of a natural waterbody, means the whole of the soil of the channel in which the waterbody flows, including the portion that is alternatively covered and left bare with an increase or diminution in the supply of water and that is adequate to contain the waterbody at its average or mean stage without reference to extraordinary freshets in the time of flood or to extreme droughts.*	

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
7.6 Riparian land and watercourses	*(1) The objective of this clause is to protect and maintain the following:* *(a) water quality within watercourses,* *(b) the stability of the bed and banks of watercourses,* *(c) aquatic and riparian habitats,* *(d) ecological processes within watercourses and riparian areas.* *(2) This clause applies to all of the following:* *(a) land identified as "Riparian Land" on the Riparian Lands and Watercourses Map,* *(b) land identified as "Watercourse Category 1", "Watercourse Category 2" or "Watercourse Category 3" on that map,* *(c) all land that is within 50 metres of the top of the bank of each watercourse on land identified as "Watercourse Category 1", "Watercourse Category 2" or "Watercourse Category 3" on that map.* *(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:* *(a) whether or not the development is likely to have any adverse impact on the following:* *(i) the water quality and flows within the watercourse,* *(ii) aquatic and riparian species, habitats and ecosystems of the watercourse,* *(iii) the stability of the bed and banks of the watercourse,* *(iv) the free passage of fish and other aquatic organisms within or along the watercourse,* *(v) any future rehabilitation of the watercourse and its riparian areas, and* *(b) whether or not the development is likely to increase water extraction from the watercourse, and* *(c) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.*	The *Riparian Lands and Watercourses Map* that accompanies the SLEP 2014 identify a class 1 watercourse, (Shoalhaven River) to the south of the subject site. This EA is supported by a Geotechnical Assessment carried out by Coffey Geotechnics (**Annexure 9**), which includes an assessment of potential impacts associated with riverbank stability (see Section 8.7 of this EA).

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
7.6 continued	*(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:* *(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or* *(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or* *(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.* *(5) For the purpose of this clause:* ***bank** means the limit of the bed of a watercourse.* ***bed**, of a watercourse, means the whole of the soil of the channel in which the watercourse flows, including the portion that is alternatively covered and left bare with an increase or diminution in the supply of water and that is adequate to contain the watercourse at its average or mean stage without reference to extraordinary freshets in the time of flood or to extreme droughts.*	
7.7 Landslide risk and other land degradation	*(1) The objective of this clause is to maintain soil resources and the diversity and stability of landscapes, including protecting land:* *(a) comprising steep slopes, and* *(b) susceptible to other forms of land degradation.* *(2) This clause applies to the following land:* *(a) land with a slope in excess of 20% (1:5), as measured from the contours of a 1:25,000 topographical map, and* *(b) land identified as "Sensitive Area" on the Natural Resource Sensitivity—Land Map.* *(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider any potential adverse impact, either from, or as a result of, the development in relation to:* *(a) the geotechnical stability of the site, and* *(b) the probability of increased erosion or other land degradation processes.*	

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
7.7 continued	*(4) Before granting consent to development on land to which this clause applies, the consent authority must be satisfied that:* *(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or* *(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or* *(c) if that impact cannot be minimised – the development will be managed to mitigate that impact.* *(5) In this clause, topographical map means the most current edition of a topographical map, produced by Land and Property Information, a division of the Department of Finance and Services, that identifies the Council's local government area and boundary.*	
7.8 Scenic protection	*(1) The objective of this clause is to protect the natural environmental and scenic amenity of land that is of high scenic value.* *(2) This clause applies to land identified as "Scenic Protection" on the Scenic Protection Area Map.* *(3) In deciding whether to grant development consent for development on land to which this clause applies, the consent authority must:* *(a) consider the visual impact of the development when viewed from a public place and be satisfied that the development will involve the taking of measures that will minimise any detrimental visual impact, and* *(b) consider the number, type and location of existing trees and shrubs that are to be retained and the extent of landscaping to be carried out on the site, and* *(c) consider the siting of the proposed buildings.*	The subject land is <u>not</u> identified as being within a "*Scenic Protection"* area by *Scenic Protection Area Mapping* that accompanies the SLEP 2014. The provisions of this clause therefore do not apply to the subject site. However the development site is adjacent to the northern bank of the Shoalhaven River which is identified as being within a Scenic Protection area. The visual impact associated with this proposal is discussed in Section 8.5 of this EA.
7.15 Development in the vicinity of extractive industries and sewerage treatment plants	*(1) The objective of this clause is to protect the operational environment of certain industries operating on the land to which this clause applies.* *(2) This clause applies to land identified as "Extractive Industry" and "Sewage Treatment Plant" on the Buffers Map.*	The Buffers M*ap* that accompanies the SLEP 2014 identifies the subject land is located within the vicinity of a sewerage treatment plant.

Table 2 (continued)

SLEP 2014 Clause	*Provisions*	*Comments*
7.15 continued	*(3) Development consent must not be granted to the carrying out of development on land to which this clause applies unless the consent authority has:* *(a) made an assessment of the impact of noise, odour and other emissions from any industry carried out on that land, and* *(b) considered the potential impact of noise, odour and other emissions associated with that industry on any activities that will be associated with the development, and* *(c) considered any opportunities to relocate the development outside that land, and* *(d) has considered whether the development would adversely affect the operational environment of that industry.*	The SEE is supported by an Air Quality Modelling (**Annexure 5**) and a Noise Impact that make recommendations for the development. Noise impact Assessment (**Annexure 6**).

4.4 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT

The existing Shoalhaven Starches factory site and Environmental Farm has an Environmental Protection Licence (EPL) under the Protection of the Environment Operations Act 1997 (POEO Act) (EPL No. 883). The licence imposes requirements in terms of:

- discharges to air, water and land;
- irrigation controls;
- management of irrigation;
- maintenance of irrigation reticulation;
- odour control.

Following consultation with the Department of Planning and Environment in relation to this modification proposal, the Environmental Assessment is required to include detailed air quality, odour and noise assessments in accordance with relevant EPA guidelines. The assessments should provide a comparative analysis against the improved impacts of the Project Approval. Air quality and odour are discussed in Section 8.3 of this EA and noise is discussed in Section 8.2.

No additional environmental monitoring beyond that required for the Project Approval is understood to be required by the EPA in association with this modification proposal.

5.0 THE MODIFICATION PROPOSAL

5.1 INTRODUCTION

The proposal will seek approval for undertaking alterations to the existing Flour Mill on the existing Shoalhaven Starches factory site at Lot 1 DP 838753 Bolong Road, Bomaderry.

5.2 EXISTING FLOUR MILL

Wheat is delivered to the subject site five times per week in rail hopper cars nominally of 60 tonne capacity. Each train delivers approximately 2,100 tonnes of wheat.

Wheat delivered to the site by train is discharged through a grid below the train hopper outlet using the grain intake system and is transported via drag chain conveyors and a bucket elevator system into two silos each of 1,600 tonne capacity.

Wheat is taken from the raw wheat silos, weighed and then passed through various cleaning operations as follows:

- Sieves for the removal of impurities larger or smaller than wheat;
- Gravity separators for the removal of heavy impurities such as stones;
- Magnetic separators for the removal of ferrous metal impurities; and
- Aspirators, using air currents, for the removal of lighter impurities.

The moisture content of wheat received at the site is typically in the range of 8% to 10% which is too dry for milling. Water is therefore be added to the wheat in a carefully controlled manner to increase the moisture content of the grain to around 15%. The damped wheat is then stored in a conditioning or tempering bin where it remains for a period of time (normally up to 24 hours) to allow the added moisture to be fully absorbed into the grain.

Conditioning of grain:

- Assists in the separation of the component parts of the grain by toughening the bran to ensure a clean separation of the endosperm from the bran and germ; and
- Allows the reduction rollers to grind the endosperm into flour with the minimum power consumption and ensure accurate and easy sifting on the following sieving machines.

When the grain is at the optimum milling condition it is taken from the conditioning bins and passed through final scouring, weighing and separation stages before being passed to the mill.

Milling is carried out on roller mills which mill the grain into progressively finer fractions. Each milling process is followed by coarse sieving to separate large flakes of bran and chunks of endosperm which then passes to the next milling cycle. The finer starchy material is passed over a series of progressively finer sieves to remove any flour and to grade the remaining particles into various sizes for further grinding.

Flours from the various grinding operations are collected and blended together before passing through final treatment and weighing operations to bulk storage bins. Flour is taken from these bins for use in the site production processes.

The coarse particles left at the end of the reduction system, known as pollard, and the bran from the end of the break system is combined into a single by-product (DDG – Dried Distillers Grain) for sale as animal feed.

All air extracted from the mill is passed through bag houses prior to being discharged to the atmosphere.

Pneumatic conveying is used extensively to transport product throughout the mill. The air blower is mounted in an acoustic enclosure.

The mill is powered by electrical energy and uses compressed air only for instrument use.

The process is a dry process. There is no requirement for bunding and no process water is used other than the initial conditioning water which is 100% absorbed into the wheat and which comes from the water break tank.

5.3 PROPOSED MODIFICATIONS TO THE EXISTING FLOUR MILL

Shoalhaven Starches propose to undertake modifications to the existing Flour Mill to increase the amount of flour that will be able to be produced on the site. The proposal will involve the installation of additional plant largely within the confines of the existing Flour Mill building footprint. External alterations will comprise additional plant located on top of the existing Flour Mill building and a small building extension. The additional roof top plant will include additional silencers in conjunction with existing silencers; as well as a bucket elevator and conveyors. The building extension will be located between the existing Flour Mill building and adjacent silos and will have a building footprint of 3 m x 4 m and an overall height of 40 m.

As is evident from **Figure 4** below the proposed alterations to the existing Flour Mill will result in an increase in flour that will be able to be produced on site by 2,700 tonnes per week to a total of 7,700 tonnes per week.

The project will increase the total flour production capacity on site from the currently approved limit of 265,000 tonnes per annum up to 400,000 tonnes per annum.

The overall amount of flour used in the production process at the Bomaderry site will however remain within the approved 20,000 tonnes per week limit.

The proposed modifications to the existing Flour Mill will enable subsequent spare capacity at the Company's other flour mills to be devoted to the production of higher grade flour therefore increasing export opportunities for the Company.

The difference between the existing (approved) rates of flour processing and proposed rates following the proposal is shown in the **Figure 4** below.

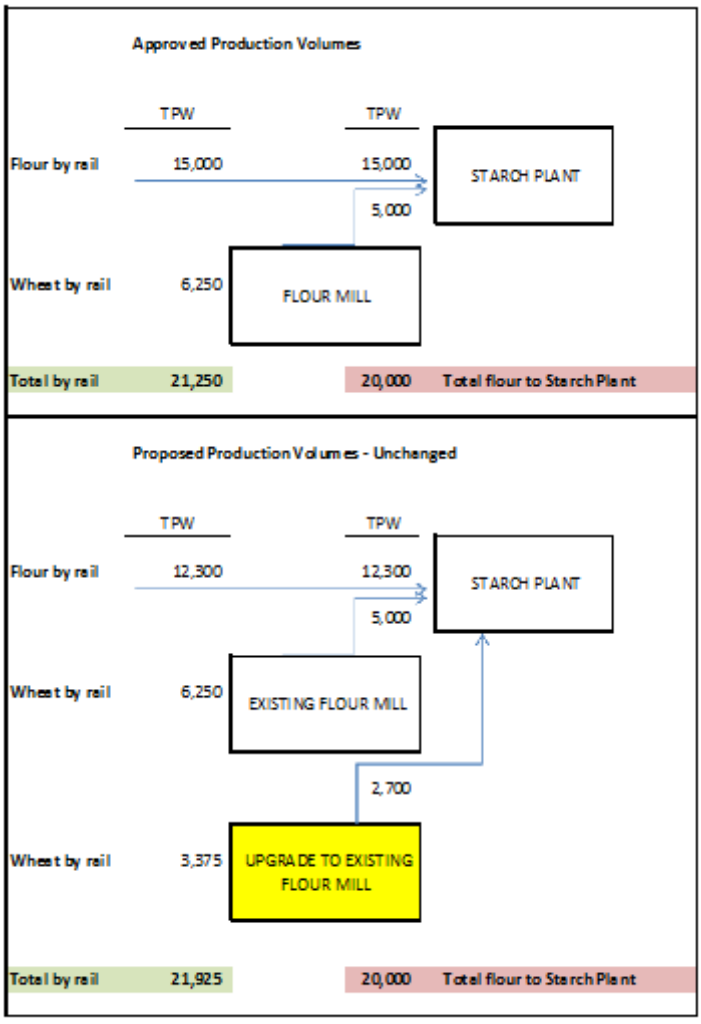

Figure 4: Flour processing rates at Shoalhaven Starches prior to and following modifications to Flour Mill

The upgrade will require an additional 3,375 tonnes per week of wheat grain to feed the modified Flour Mill. This will be offset however by a reduction in the amount of flour received (2,700 tonnes per week) from the Company's other flour mills. The net effect of this is an overall increase in rail freight of up to 675 tonnes per week to the site.

The new equipment will largely be housed within the existing Flour Mill structure. No new storage silos will be required, either for grain or flour, as part of this project.

The processing of the additional volume of wheat will be accomplished by reducing the tempering time during the initial conditioning stage of the process. As discussed in Section 5.2, the wheat is dampened with water and then stored to allow water to penetrate into the wheat kernel. This makes the bran tough and elastic, and minimizes bran fines during milling. Reducing the tempering period will allow more efficient storage requirements for the wheat grain, in which case the existing silos will be sufficient for the additional grain processing requirements associated with this proposal.

New equipment (ie. within the existing building and on the roof top) will include:

- Conveying and transfer systems for raw materials, intermediate products and flour. This includes chain conveyors, screw conveyors and bucket elevators;
- Additional three (3) roller mills and other equipment for grinding and processing flour. The additional equipment includes a third Combi Cleaner (for removing husk and stones), magnetic separators, weighers, dampeners (where water is added to the wheat) and impact detacher;
- A new 4 m^3 hopper for intermediate storage of residual material (wheat) within the front-end processing equipment when the plant trips;
- Sifters for separating various particle sizes; and
- Dust collectors (baghouse filters) for dust control.

As a result of the two additional dust collectors and fans, there will be two additional exhausts from the roof of the Flour Mill. These will be exhausted in the same way as the existing emission vents, ie. though silencers and directed vertically upward.

The processing of additional flour on site will require an additional 14,200 litres of water per day (5,200 kilolitres per year) to temper the wheat grains. The additional water is absorbed by the grains and there will be no increase in waste waters generated by this process.

Plan details of the proposed alterations to the existing Flour Mill are provided in **Annexure 1**.

Construction Works

The construction phase is estimated to take place over a period of two (2) months and will comprise the following stages:

- An initial one (1) month construction phase involving additional penetrations and structural support; and
- A second month of works comprising the mechanical installation phase.

The construction works will require up to 20 construction staff on-site daily (through both phases) and up to two (2) construction material carrying heavy vehicles per day for the first month of construction.

The proposed hours for construction works are as follows:

- 6:00/7:00 am to 5:00/6:00 pm Monday to Friday; and
- 8:00 am to 1:00 pm on Saturdays.

5.4 THE EXISTING GRAIN PLANT

Waste product from the starch, gluten and syrup production processes at the factory are combined to feed the fermentation and distillation stage in the ethanol production process. The outputs of the process are fuel and industrial grade ethanol. The residue from the ethanol process is directed to stillage recovery plant, the reclaimed water from the stillage recovery plant is then irrigated.

The distillery at Shoalhaven Starches can be supplied feed material from 2 sources on the site:

- starch from the starch plant; and
- crushed grain from the grain processing plant.

These feed streams are fermented and distilled in the distillery. The product from the distillery is ethanol. The by-products from this process are the remaining grain husks and “unfermentables” from the feed stream; carried by water.

Mill feed is used as a coarse fibre in the feed to the DDG dryers as part of the stillage recovery process to dry soluble solids recovered from wastewater by evaporation. If insufficient fibre is fed into the dryers, the moist syrup fed into the dryers cannot be adequately absorbed and the product becomes “sticky”. After a period the syrup sticks to the heating surface of the dryer resulting in a loss of drying capability.

There is therefore a need to mix grain fibre into the syrup to ensure that the mixture is sufficiently friable to enable the DDG Dryers to operate efficiently.

The processing of wheat in the modified Flour Mill will also create husk material (in effect the waste material from the milled wheat grains) from the milled wheat. This husk material or "mill feed" can be used with the grain fibre in the DDG dryers. As a result the amount of mill feed transported to the site to feed the grain plant will be able to be reduced.

5.5 THE STARCH PLANT

The proposal will enable a reduction in the amount of flour transported to the site, as up to 38% of the flour used to produce the starch and gluten will be able to be processed on the site (compared to a current figure of 25%).

Overall production rates will remain as approved. The total flour processed on site within the existing starch plant will not exceed the previously approved amount of 20,000 tonnes per week from the modified Flour Mill on the site, as well as that transported to the site by rail.

As the proposal merely relates to a change in the manner by which flour is supplied to the production process, no modifications are proposed for the starch plant.

5.6 ETHANOL PLANT

The ethanol plant utilises waste from the starch, gluten and syrups components of the plant to feed fermentation and distillation of ethanol production. In effect the ethanol production comprises an integral component of the Company's waste treatment process. As this proposal does not seek to increase overall production rates at the site; and as the proposal will not result in any net increase in wastewaters processed on the site; the proposal will have no impact on the existing ethanol plant and its associated processes.

5.7 WASTEWATER TREATMENT AND DISPOSAL

5.7.1 Stillage Recovery

The 2003 approval by the Minister of the Company's Pollution Reduction Program No. 7 introduced a Stillage Recovery process into the production process at the plant. The objective of stillage recovery seeks to improve the system for the removal of suspended and soluble solids within the Company's wastewater system.

This process includes the use of decanters, evaporators and DDG dryers.

Decanters are essentially mechanical separation devices which operate by centrifugal separation process that separates out the unfermented suspended solids in stillage, ie. the waste liquid left over from the distillation of ethanol.

Evaporators are designed to reduce the water content of "overflow" stillage (after it passes through the decanters). The evaporators operate by mechanical vapour recompression. The overflow from the decanters is fed into tubes within the evaporator and heated by steam. The liquid within the overflow is heated to a point where it evaporates and is separated from the remaining solids, which remain as syrup. The liquid (ie. condensate) is captured and directed to the environmental farm for irrigation, ie. the reclaimed water.

The syrup product is directed to DDG dryers for further drying. The DDG dryer is essentially a casing in which a bundle of steam tubes are rotated at low speed. Evaporator concentrate (syrup) and decanter concentrate (wet insoluble solids) are fed into one end of the casing and transferred through to the other end by shovels. Heat from the tubes removes moisture.

Dried DDG is removed from the barrel and conveyed to the storage room for further loading into trucks.

The wheat processed at the modified Flour Mill will produce flour and residue husk material or "mill feed". The mill feed produced on site will be able to be fed into the DDG dryers in place of mill feed transported by rail.

The proposal however will have no other implications for ethanol production on the site.

5.7.2 Effluent Irrigation

As outlined the total amount of flour processed at the site will not exceed the previously approved amount of 20,000 tonnes per week. Whilst there will be a minor increase in water consumption from the site associated with the conditioning of the wheat; this will result in the commensurate amount of moisture in the flour produced on-site compared to the amount of moisture that would have been found in the flour that is currently transported to the site. The moisture required to condition the wheat will therefore not result in increases in wastewaters through the process. Consequently wastewater volumes required to be irrigated onto the Company's Environmental Farm will remain unchanged following the proposed alterations to the existing Flour Mill.

5.8 ENERGY AND UTILITIES

The existing plant has the capacity to produce 200 t/h of process steam by four boilers. The boilers are fuelled by gas, coal and biogas.

The site currently has an electricity supply of 20 MVA and approval to increase this to 39 MVA.

The Company also currently utilises 2 Petajoules of Natural Gas.

The proposed Flour Mill alterations are estimated to require an additional 1.5 MVA of power.

6.0 CONSULTATION

During the preparation of this EA consultation has been undertaken with the Department of Planning and Environment.

Shoalhaven Starches have consulted with staff from the Department of Planning & Environment with respect to this proposal. The Secretary of the Department of Planning has issued requirements for this EA. In framing these requirements the Department also consulted with the EPA. These requirements, including correspondence from the EPA form **Annexure 2** to this EA.

7.0 RISK ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS

The purpose of this section of the EA is to provide a risk assessment of the potential environmental impacts associated with the project. This section (**Table 3**) compares the potential impacts from the proposed modification against the approved project. The comparison uses the key environmental impacts assessed in the EA and summarises the relative change in environmental impacts associated with the proposed modification.

Table 3

Risk Assessment

Issue	*Relative Change in Environmental Impact*	*Additional Management or Mitigation Measures Required*	*Significance of Issue with this Modification Proposal*
Air Quality (including Odour) Assessment	One of the primary issues that was addressed in the original EA for the Shoalhaven Starches Expansion Project concerned the need for a comprehensive odour assessment and reduction as part of the project. Stephenson Environmental Management Australia (SEMA) have been engaged by Shoalhaven Starches to undertaken an Air Quality Impact Assessment (AQIA) with respect to this Modification Proposal. A copy of SEMA's assessment is included as **Annexure 5** to this EA.	This AQIA prepared by SEMA addresses the cumulative impacts of the approved ethanol expansion project development and the proposed Flour Mill modifications and does not propose any specific management or mitigation measures.	Air quality impacts are further addressed in Section 8.3 of this EA.
Greenhouse Gas Emissions	Greenhouse gas emissions from the proposed Flour Mill modifications would be predominantly associated with the electrical energy required for the operation of the plant, equipment and lighting. The proposal would result in an overall increase in rail freight of up to 675 tonnes per week to the site (based on reduced flour deliveries by rail but also increased grain deliveries by rail). Additionally, because the processing of wheat in the modified Flour Mill will also create husk material (mill feed), the amount of mill feed transported to the site to feed the grain plant will be able to be reduced. Overall, this does not mean that additional train trips will be generated across Bolong Road to the site, but only that existing trains will be able to carry capacity loads as opposed to the under capacity loads they currently carry. Similarly, the capacity of the Shoalhaven Starches operations – and specifically product carrying heavy vehicle generation - would not be increased by the proposal; while additional grain would be stored on-site, the output of the Shoalhaven	No additional management or mitigation measures proposed.	This was not a key issue identified by the SEARs for this project.

Table 3 (continued)

Issue	*Relative Change in Environmental Impact*	*Additional Management or Mitigation Measures Required*	*Significance of Issue with this Modification Proposal*
Greenhouse Gas Emissions *(continued)*	Starches site (in accordance with past approvals and traffic assessments) would remain unchanged. Consequently the potential changes in greenhouse gas emissions are considered to be negligible.		
Wastewater Treatment	***Water Discharges*** The Shoalhaven Starches Factory and Environmental Farm are licensed premises under the Protection of the Environment Operations Act. Wastewater discharges from the site are licensed by the DEC (EPL 883). The plant has a licensed outfall into the Shoalhaven River. The outfall point is a 50 cm diameter metal pipe discharging at the end of an existing jetty. It also has a cooling water discharge comprising a 50 cm diameter pipe which discharges onto a gabion spillway. Under the terms of the Company's EPL water waste streams associated with the plant include: • river water passed through the boiler condensers and the primary side of the heat exchangers; • boiler water treatment plant regeneration waters; and • pH adjusted glucose plant ion exchange unit regeneration waters. All these must be discharged from the cooling water discharges. The limiting conditions in relation to these discharges include: • The volume of water discharged from the cooling water discharges must not exceed 100,000 kilolitres per day.	No additional management or mitigation measures proposed.	Not a key issue.

Table 3 (continued)

Issue	*Relative Change in Environmental Impact*	*Additional Management or Mitigation Measures Required*	*Significance of Issue with this Modification Proposal*
Wastewater Treatment *(continued)*	• The waste waters discharged at both points shall not exceed a temperature of 32°C. • The water discharged from both discharges shall not contain more than 500 micrograms per litre of chlorine; and comprise a pH within the limits of 6.5 to 8.5. The modified Flour Mill proposal will not involve any changes to these discharges waters. ***Site Stormwater Management*** *Existing Site Stormwater Management System* Shoalhaven Starches existing site stormwater management system is divided into three zones. The zones are: • eastern portion of the site – all site stormwater is collected and passed through a first flush pit to remove gross solids and pollutants prior to discharge to the Shoalhaven River; • central portion of the site – all site stormwater is collected in pits and drainage channels and conveyed to the Environmental Farm where it is stored in dams prior to being irrigated. No stormwater from this zone is discharged to the Shoalhaven River; and • the Western portion of the site – all stormwater is collected and pumped to the Environmental Farm during small storm events. Stormwater is discharged to the Shoalhaven River during heavy rainfall events.		

Table 3 (continued)

Issue	*Relative Change in Environmental Impact*	*Additional Management or Mitigation Measures Required*	*Significance of Issue with this Modification Proposal*
Wastewater Treatment *(continued)*	*Construction Stormwater Management* The proposed modifications to the existing Flour Mill will be confined to the existing building footprint and no site works will be necessary. Therefore the proposal will have no implications for the management of stormwater during construction of the proposed alterations. *Operational Stormwater Management* The proposed works would not alter the existing site stormwater management system, and consequently all stormwater generated by the proposed Flour Mill modifications during the operational phase would be discharged to the Environmental Farm. The proposed Flour Mill modifications would also not increase the volume of stormwater generated from this area of the site during operation as the area is currently all surfaced with bitumen.		
Effluent Irrigation and Storage	The total flour processed on the site as a result of this proposal will not exceed the previously approved amount of 20,000 tpw. Consequently wastewater volumes will remain unchanged. The treatment and management of wastewater from the site is therefore not envisaged to be a key issue that will need consideration as part of the Environmental Assessment. No change in environmental impacts from that originally identified in EA.	No additional management or mitigation measures proposed.	Not a key issue.

Table 3 (continued)

Issue	*Relative Change in Environmental Impact*	*Additional Management or Mitigation Measures Required*	*Significance of Issue with this Modification Proposal*
Site Contamination, Acid Sulphate Soils and Riverbank Stability	***Site Contamination*** Based on the site history, two potentially contaminating activities were identified within the site comprising: • Potential presence of fill soils (of unknown origin and quality), and • Chemical storage. Fill soils have been tested in the past nearby the current development site. Concentrations of contaminants were less than adopted guideline criteria. Based on the assumption that fill soil types are likely to be similar within the site, it is considered unlikely that fill soils are contaminated. The site is currently paved, with stormwater drainage, which would limit infiltration of potential contaminants into underlying groundwater and soil. The potential for widespread contamination in soil and groundwater from the use of the types of chemicals identified in the site history and walkover is considered low. Previous soil sampling and analysis in the general vicinity supports this. Based on the review of previous information, supplemented with additional site history and site observations, it is considered unlikely that contamination is present in this area that would pose an unacceptable risk to current or future site users with respect to the proposed industrial land use. The proposed modifications to the existing Flour Mill will be confined to the existing building footprint and no site works will be necessary. Under these circumstances it is considered that there will be no need for any further assessment in terms of site contamination in relation to this proposal.	No additional management or mitigation measures proposed.	Not a key issue.

Table 3 (continued)

Issue	*Relative Change in Environmental Impact*	*Additional Management or Mitigation Measures Required*	*Significance of Issue with this Modification Proposal*
Site Contamination, Acid Sulphate Soils and Riverbank Stability *(continued)*	***Acid Sulphate Soils*** The entire subject site is identified as potentially containing acid sulfate soils. The proposed modifications to the existing Flour Mill will be confined to the existing building footprint and no site works will be necessary. Under these circumstances it is considered that there will be no need for any further assessment in terms of acid sulfate soils.	No additional management or mitigation measures proposed.	Not a key issue.
	Riverbank Stability The northern bank of the Shoalhaven River is located to the south of the existing Flour Mill site. Consideration should be given to the potential effects of the proposed modifications on the stability of the river bank and the potential effects of the river bank movement on the stability of the Flour Mill foundation taking the additional load applied by the new plant.	***Riverbank Stability*** In relation to the river bank stability, Coffey's make the following recommendations: 1. *The performance of the revetment wall and the condition of the river bed beyond the toe of the revetment wall will need to be monitored on a regular basis. Conduct regular survey monitoring of the revetment wall every 3 months to assess whether there is an ongoing pattern of movement over the next 12 months. If movement is insignificant during this time monitoring could then be reduced to once per year or after significant rainfall events that result in river levels rising more than 1m above the high tide level. Survey data for the river bed to a distance of 15m off the toe of the wall should also be carried out during the wall monitoring to check for changes in the bed profile;*	Identified by SEARS as a key issue. Riverbank stability is addressed in Section 8.7 of this EA.

Table 3 (continued)

Issue	*Relative Change in Environmental Impact*	*Additional Management or Mitigation Measures Required*	*Significance of Issue with this Modification Proposal*
Site Contamination, Acid Sulphate Soils and Riverbank Stability (continued)		1. *Conduct regular visual observations to assess any obvious change to ground features in the surrounding area. The effects of major rain events, flooding or any significant deepening or steepening of the river bed close to the revetment wall will need to be assessed; and* 2. *Regular reviews of the survey data should be undertaken, and ongoing maintenance of the revetment wall or repairs where required.*	
Noise	Shoalhaven Starches are licensed under the POEOP Act (Environment Protection Licence No. 883) which sets noise limits for the operation of the overall factory complex. Noise goals have been designed for the site to ensure existing noise levels are not increased by additional plant. The noise goals for any new plant are 10 dBA below the EPL noise limits and range between 28 and 32 dBA depending upon the residential receptor location. The EA is supported by a Noise Impact Assessment prepared by Day Design Pty Ltd. A copy of this assessment is included in **Annexure 6** to this EA. Noise Impacts are further addressed in Section 8.2 of this EA. Day Design conclude in summary that the modification proposal will comply with the design noise goal limits imposed on the overall Shoalhaven Starches factory complex by the EPL for the site.	The Noise Impact Assessment prepared by Day Design makes recommendations in terms fitting each of the fans proposed to be installed within the existing Flour Mill as part of this proposal with silencers. Day Design recommend fitting silencers to the discharge side of each fan. Day Design outline that each of the silencers should achieve minimum insertion losses.	This issue has been identified by the SEARs. Noise impacts are further addressed in Section 8.2 of this EA.

Table 3 (continued)

Issue	*Relative Change in Environmental Impact*	*Additional Management or Mitigation Measures Required*	*Significance of Issue with this Modification Proposal*
Transport & Traffic	The SEARs for this project have identified that a traffic assessment is required to be undertaken in relation to this proposed modification. As outlined in Section 5.2, the proposal will free up the production capacity of the Company's other Flour Mills to enable an increase in production of premium grade flour by modifying the existing Flour Mill at the subject site to increase the amount of industrial grade flour produced at the site. At present industrial grade flour is supplied to the subject site by flour produced at the Manildra Flour Mill which is delivered to the subject site by rail; as well as by the existing Flour Mill located on the site which processes wheat grain also delivered to the site by rail. The effect of the proposal will be an overall increase in incoming rail freight of up to 675 tonnes per week. Additionally, because the processing of wheat in the modified Flour Mill will also create husk material (mill feed), the amount of mill feed transported to the site to feed the grain plant will be able to be reduced. As a consequence of the above changes, consideration will therefore need to be given to the effects that this increase in rail freight with have on existing rail and traffic movements. The proposal will not change existing heavy vehicle movements to and from the site; the proposal will involve an increase in tonnage of raw materials that will be required to be transported to the site by rail. This does not mean that additional train trips will be generated across Bolong Road to the site, but only that existing trains will be able to carry capacity loads as opposed to the under capacity loads they currently	The EA is supported by a Traffic Assessment carried out by ARC which makes the following conclusions: • *The proposal will not generate an additional level of operational traffic to the local traffic network.* • *The proposal will not result in additional rail movements or train crossings of longer duration at the Bolong Road rail crossing.* • *Construction vehicle trips would be generated over a short period, and will be minimised through the provision of group transport for staff.* • *The construction trip generation would have no significant impact on the operation of local intersections of access points to the site.* • *Construction staff parking will be provided adjacent to the construction area.* • *An appropriate set of construction traffic management strategies will be put in place through the construction period.*	Traffic issues are further addressed in Section 8.6 of this EA.

Table 3 (continued)

Issue	*Relative Change in Environmental Impact*	*Additional Management or Mitigation Measures Required*	*Significance of Issue with this Modification Proposal*
Traffic & Transport (continued)	carry. Similarly, the capacity of the Shoalhaven Starches operations – and specifically product carrying heavy vehicle generation - would not be increased by the proposal; while additional grain would be stored on-site, the output of the Shoalhaven Starches site (in accordance with past approvals and traffic assessments) would remain unchanged. Once constructed and operational, the proposal would not generate any additional staff or [product carrying] heavy vehicle trips, but rather simply form part of the existing Flour Mill operations at the site. As discussed above, nor would the Proposal increase train movements to/from the site. In summary, once operational the proposal would have no impact on the operation of the local traffic environment or on existing on-site operations. The only period during which the proposal would generate additional vehicle trips to the local road network would be during construction.		
Hazards	The SEARs for this project have identified that a Preliminary Hazard Analysis (PHA) is required to be undertaken in relation to this proposed modification which in effect updates the existing PHA with the new processes and additional equipment.	The PHA prepared by Pinnacle Risk includes a range of recommendations in relation to this Modification Application.	Key issue – addressed further in Section 8.1 of this EA.
Flooding	The SEARs for this project have identified that a flood assessment is required to be undertaken in relation to this proposed modification. The EA is supported by a Flood Impact Assessment prepared by WMAwater (**Annexure 4**). According to WMA, the existing Flour Mill is surrounded by an extensive array of existing plant and buildings. Thus the flow path of floodwaters from the Shoalhaven River	No additional management or mitigation measures proposed	This is a key issue identified by SEARs. Flooding is further addressed in Section 8.4 of this EA.

Table 3 (continued)

Issue	*Relative Change in Environmental Impact*	*Additional Management or Mitigation Measures Required*	*Significance of Issue with this Modification Proposal*
Flooding (continued)	over the river bank and towards Bolong Road is already significantly impeded. In addition, the majority of the proposed works are above the Probable Maximum Flood (PMF) level (all works except the proposed 3m x 4m building extension) and therefore their construction will have no impact on flood levels. According to WMA, construction of the building extension will have an insignificant impact on flood levels due to the density of the surrounding existing plant and the small size of the extension. In conclusion, WMA consider that there would be no increase in the 1% AEP flood level as a result of the proposed works.		
Waste Management	The proposed Flour Mill modifications will not alter the way waste is managed on the site. No change in environmental impacts from that originally identified in EA.	No additional management or mitigation measures proposed	Not a key issue.
Visual Impact	The existing Flour Mill has a height of 32.05m. The proposal involves new equipment that will be housed largely within the confines of the existing Flour Mill building footprint only; no external additions to the existing building footprint are necessary, although the proposal will involve additional plant being located on top of the existing building. The proposed new roof top plant will have a maximum height of 4.6m from the existing roof level. The existing building height will remain unchanged.	It is a recommendations of this EA that where appropriate and possible, the proposed alterations to the existing Flour Mill building should be constructed of similar materials as those previously used on the site and be of a non-reflective nature. Colours should blend with existing structures on the site to ensure visual harmony. Consideration should be given to incorporating a cladding colour if possible which will match existing development on the site.	Key issue – addressed further in Section 8.5 of this EA.

Table 3 (continued)

Issue	*Relative Change in Environmental Impact*	*Additional Management or Mitigation Measures Required*	*Significance of Issue with this Modification Proposal*
Visual Impact (continued)	Given that the proposal will largely involve internal works, and that the proposed minor external alterations will be located within the existing industrial complex it is not expected that the new development will have an undue effect due to its height.		
Flora and Fauna	Given the nature of the site and that the proposal does not alter the footprint of the existing Flour Mill building, the proposal will not have any adverse impacts on the ecological value of the land. The original Flora and Fauna Assessment carried out by Kevin Mills & Associates for the Expansion Project did not identify any specific ecological constraints with this part of the site. No change in environmental impacts from that originally identified in EA.	No additional management or mitigation measures proposed.	Not a key issue.
Heritage and Archaeological Issues	The proposal does not alter the footprint of the existing Flour Mill building. The factory site was not previously identified by the EA for the Shoalhaven Expansion Project as an area subject to either Aboriginal or European cultural heritage significance. The original Aboriginal Archaeological Assessment that supported the EA prepared by South East Archaeology did not identify any constraints with respect to this part of the site or this project. The proposed Flour Mill modifications will have no additional impact in terms of indigenous or non-indigenous heritage. No change in environmental impacts from that originally identified in EA.	No additional management or mitigation measures proposed.	Not a key issue.

Following the above risk assessment of the potential environmental impacts of the proposed modification the key issues for assessment are:

- Preliminary hazard analysis;
- Noise impacts;
- Air quality (and including odour) impacts;
- Flooding;
- Visual impact;
- Traffic; and
- Riverbank stability.

8.0 KEY ISSUES

8.1 PRELIMINARY HAZARD ANALYSIS

The Environmental Assessment Requirements issued by the NSW DoPE for this project require the following to be addressed:

> *Hazards - updated Preliminary Hazard Analysis for the flour mill prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis (DoP, 2011). The PHA should estimate the cumulative risks from the existing and proposed development.*

This Modification Application is supported by a Preliminary Hazard Analysis prepared by Pinnacle Risk Management Pty Ltd ("Pinnacle"). A copy of this PHA forms **Annexure 7** to this EA. This section of the EA is based upon the findings of this assessment.

The PHA prepared by Pinnacle assesses the credible and potential hazardous events and corresponding risks associated with the proposed modifications to the existing Flour Mill with the potential for off-site impacts only.

Rail transport risk is qualitatively reviewed given the rail system is an existing infrastructure for the site and the net increase in flour movements is relatively low.

In accordance with the approach recommended by the DoPE in *Hazardous Industry Planning Advisory Paper (HIPAP) 6 – Hazard Analysis* the underlying methodology of the PHA is risk-based, that is, the risk of a particular potentially hazardous event is assessed as the outcome of its consequences and likelihood.

The PHA prepared by Pinnacle was conducted as follows:

- Initially, the modifications to the existing Flour Mill and their location were reviewed to identify credible, potential hazardous events, their causes and consequences. Proposed safeguards were also included in this review;
- As the potential hazardous events are located at a significant distance from other sensitive land users, the consequences of each potential hazardous event were estimated to determine if there is any possible unacceptable off-site impacts;
- Included in the analysis is the risk of propagation between the proposed equipment and the adjacent processes; and
- If adverse off-site impacts could occur, assess the risk levels to check if they are within the criteria as outlined in the DoPE's *HIPAP 4 – Risk Criteria for Land Use Safety Planning*.

8.1.1 Hazard Identification

Hazardous Materials

Wheat:

Wheat, like barley, oats and rye, is a cereal grain. Wheat grains are generally oval shaped although different wheats have grains that range from almost spherical to long, narrow and flattened shapes. The grain is usually between 5 and 9 mm in length and weighs between 35 and 50 mg.

There are three main components to the grain:

Bran:

The outer coating or "shell" of the wheat kernel is made up of several layers. These layers protect the main part of the kernel.

Endosperm:

This is the main part of the wheat kernel and represents about 80% of the kernel weight. It is from this part that white flour is milled. The endosperm is rich in energy-yielding carbohydrate and important protein.

Germ or Embryo:

This part grows into a new plant if sown. The germ lies at one end of the grain and represents only 2% of the kernel. It is a rich source of B vitamins, oil, vitamin E and natural plant fat. It needs to be removed during milling because the fat is liable to become rancid during flour storage.

Dust from wheat can be formed by activities such as loading / unloading, filling a silo, milling and pneumatic conveying. According to Pinnacle it is a potentially explosive dust when critical parameters exist, eg. particle size less than 500 micron and moisture content less than 30%.

Ignition sources include:

- Smouldering, self-heating or burning dust;
- Open flames, eg. welding, hot work, cutting and matches;
- Hot surfaces, eg. hot bearings, dryers, incandescent materials and heaters;
- Lightning;
- Heat from mechanical impact or friction; and
- Electrical discharges and arcs.

According to Pinnacle grain dust explosions are deemed potentially weak explosions although it is noted that previous incidents involving grain dust explosions have led to fatalities.

Whilst grains are combustible when exposed to strong ignition sources, eg. open flames, they typically burn as a smouldering type of fire and therefore do not pose significant radiant heat hazards. Smouldering grains, however, can be a precursor to dust explosions as the hot grains can provide the ignition energy to cause a dust cloud to deflagrate.

Grain dust is a respiratory sensitiser. This means it can trigger an allergic reaction in the respiratory system. Once this reaction has taken place, further exposure to the substance, even to very small amounts, may produce symptoms. The possible ill-health outcomes are:

- Rhinitis (runny or stuffy nose);
- Coughing and breathing difficulties;
- Asthma (attacks of coughing, wheezing and chest tightness);
- Chronic bronchitis (cough and phlegm production usually in winter months);
- Chronic obstructive pulmonary disease (a longer-term illness that makes breathing progressively difficult and includes chronic bronchitis and chronic asthma);
- Extrinsic allergic alveolitis, for example farmer's lung (fever, cough, increasing shortness of breath, muscle / joint pains and weight loss); and
- Organic dust toxic syndrome, for example grain fever (a sudden onset, short-lived, 'flu-like' illness with fever and often associated with cough and chest discomfort).

The above health effects are more likely for people with significant exposure to grain dust on-site but not off-site due to the controls to prevent fugitive emissions.

Potential Hazardous Incidents Review

In accordance with the requirements of *HIPAP 6* it is necessary to identify hazardous events associated with the facility's operations. As recommended in HIPAP 6, the PHA focuses on "*atypical and abnormal events and conditions. It is not intended to apply to continuous or normal operating emissions to air or water*".

In keeping with the principles of risk assessments, credible, hazardous events with the potential for off-site effects have been identified by Pinnacle. That is, "slips, trips and

falls" type events are not included nor are non-credible situations such as an aircraft crash occurring at the same time as an earthquake.

The identified credible, significant incidents (in particular, with the potential for off-site impacts) for the Flour Mill's existing and new equipment are summarised in the PHA. These potential events were determined during a hazardous event identification workshop involving project, design, technical, operations and maintenance personnel on the existing mill.

8.1.2 Risk Analysis

The assessment of risks to both the public as well as to operating personnel around the modified mill requires an analysis technique that is commensurate with the nature of the risks involved. Risk analysis could be qualitative, semi-quantitative or quantitative.

The typical risk analysis methodology attempts to take account of all credible hazardous situations that may arise from the operation of processing plants etc.

Having identified all credible, significant incidents, risk analysis requires the following general approach for individual incidents:

Risk = Likelihood x Consequence

The risks from all individual potential events are then summated to get cumulative risk.

For QRA and hazard analysis, the consequences of an incident are calculated using standard correlations and probit-type methods which assess the effect of fire radiation, explosion overpressure and toxicity to an individual, depending on the type of hazard.

Pinnacle however, adopted an approach involving an assessment of the risk of the identified hazardous events as scenario based risk assessment. The reasons for this approach are:

1. *The distance from the mill to residential and other sensitive land users is large and hence it is unlikely that any significant consequential impacts, e.g. due to radiant heat from fires, from the facility will have any significant contribution to off-site risk; and*

2. *There are a limited number of process safety events. The main events of interest are dust explosions and fire events. Therefore, these are analysed in the remaining sections of this report.*

Dust Explosions

An analysis of the new equipment where potential dust explosions could occur is summarised by Pinnacle as follows:

- Baghouse filters. Dust explosions are to be vented via explosion vents (both flameless and non-flameless);
- Bucket elevators, chain conveyors and screw conveyors. Note: low conveyor speeds and belt tracking with limit switches will be used to minimise the risk of ignition, and air purging to the baghouse filters is designed to keep the dust concentration below the lower explosive limit;
- Rollers / mills. These are to be designed as per the existing units;
- Sieves and sifter. These are to be designed to ATEX standards; and
- Aspiration and pneumatic conveying systems. These are to be designed to ATEX standards.

Modelling of the only new externally vented explosion vent was carried out by Pinnacle All other explosion vents are to be flameless.

According to Pinnacle the damage radius of a dust explosion is usually limited to the building (or equipment item) in which it occurs and to a very short range outside. This is supported by the historical incidents involving dust explosions where the majority of fatalities involve on-site personnel.

The majority of dust explosion incidents according to Pinnacle resulted in no fatalities. For the incidents where fatalities occurred, these were to on-site personnel. Again, the greater risk for fatality or injury for dust explosions is to on-site personnel.

With respect to possible maximum horizontal flame length from a vented dust explosion Pinnacle indicate that no flame length has ever been measured greater than 30 m (even for large volumes). Pinnacle indicate that this should be taken as the upper limit. Pinnacle also indicate that the effects of thermal radiation from the fireball is limited to close to the fireball's surface given the short duration. Importantly, Pinnacle indicate the proposed explosion vents must therefore be directed to a safe location to avoid injury to personnel or propagation to other adjacent equipment.

Given the estimated impact distances, the height of the release and the distances to off-site areas from the new Flour Mill equipment according to Pinnacle no significant off-site impacts are expected from explosion overpressures or radiant heat from flames. According to Pinnacle the relevant risk criteria will be satisfied for potential dust explosions within equipment.

Building Explosions

It is possible that dust explosions could occur in the mill building, eg. deposited dust is not removed due to failure of the housekeeping program. This hazard exists at the site now for the existing Flour Mill.

The primary means to prevent this event is to design for containment, ie. do not release combustible dust into the building. This is the basis for the design of the existing Flour Mill and will be similarly for the new Flour Mill equipment.

Should losses of containment of combustible dust occur then controls such as housekeeping, hazardous zoning and permits to work are required. These are important measures to lower the risk of dust explosions within the existing building. As this hazard exists now on-site and the new equipment is being designed to the same standard as the existing equipment then no further safeguarding is recommended by Pinnacle for this scenario.

For equipment processing a potentially explosive dust, it is generally not possible to always ensure the concentration of the dust is below the lower explosive limit. Rather, safeguarding is required to prevent and/or control the potential explosions as discussed below.

There are no mandatory standards or regulations that dictate the design criteria and features for equipment where dust explosions can occur. However, the main means for safeguarding against dust explosions are as follows.

- Dust Free Process
- Dust Control
- Control of Ignition Sources
- Inerting
- Explosion Containment
- Explosion Isolation
- Explosion Suppression
- Explosion Venting
- Equipment Separation

With respect to this modification proposal Pinnacle indicate in practice the assessment of dust explosion hazards is bound to be subjective because the problem is too complex for quantitative analytical methods to yield an indisputable answer. Therefore, the acceptable safeguards for any given design will vary from company to company.

According to Pinnacle most of the dust explosion hazards in the grain, feed and flour industry can be eliminated by soft means such as training, motivation, improving the organisation, good housekeeping and proper maintenance. All of these safeguards are in-place at Shoalhaven Starches.

When these are combined with the additional measures proposed for the new equipment then further risk reduction is achieved. These additional measures include all equipment handling potentially explosive dust is to be designed to ATEX standards including rotary valves for seals, explosion vents (flameless to be used as much as possible), interlocks, metal traps to minimise the risk of ignitions in the mills, equipment bonding and earthing, minimisation of horizontal surfaces in the buildings where dust can collect, screw feeders to contain plugs to prevent flame propagation and hazardous area zoning with the electrics and instruments to suit the requirements.

Fires

According to Pinnacle it is possible to ignite the combustible material involved in the process, ie. grain or dust, if a strong ignition source is present.

Fires have occurred previously with these types of processes and are typically of a smouldering nature given the moisture content of the material and confinement within silos and other equipment. The moisture content is typically 10 to 12%.

According to Pinnacle fires involving flammable or combustible powder are not believed to place the public at risk but could be a threat to employees.

Given that the new mill equipment is approximately 120 m away from Bolong Road then according to Pinnacle the risk criteria will be satisfied.

Aircraft Impact and Other External Events

According to Pinnacle previous risk assessments have shown that the likelihood of an aircraft crash is acceptably low within Australia. Typical frequencies associated with aircraft crashes are:

- Scheduled aircraft $1x10^{-8}$/year; and
- Unscheduled aircraft $4x10^{-7}$/year.

The likelihood of this type of event according to pinnacle is acceptably low for a site of this size and location.

Other external events that may lead to propagation of incidents on any site include:

Subsidence	Landslide
Burst Dam	Vermin/insect infestation
Storm and high winds	Forest fire
Storm surge	Rising water courses
Earthquake	Stormwater runoff
Breach of security	Lightning
Tidal waves	

These events were reviewed by Pinnacle and none of them were found to pose any significant risk to the new facility given the proposed safeguards. Flooding can occur at this site, however, the structural design for the existing Flour Mill building includes allowances for this hazard.

Cumulative Risk

As shown in the PHA carried out by Pinnacle, the proposed changes to the Shoalhaven Starches site will have negligible impact on the cumulative risk results for the local area as the significant radiant heat levels and explosion overpressures are local to the equipment.

Therefore Pinnacle concludes that the development does not make a significant contribution to the existing cumulative risk in the area.

A review of the potential propagation risks both from and to the modified mill was conducted by Pinnacle.

There is only one new explosion vent that vents externally to the building (all other explosion vents are flameless). The external explosion vent points east from the top of the existing Flour Mill building. Pinnacle estimates flame length is approximately 13 m. There are no other structures that this vent could impact at this height.

For this externally vented explosion vent, the distance to 7 kPa is less than 1 m (it is for a small baghouse filter only). Therefore, propagation due to explosion overpressures is not expected.

Should the combustible dust containment systems fail in the existing or new equipment and the safety management systems, eg. equipment not rated to the hazardous zones, also fail then ignition can occur with a dust explosion within the building. This could cause damage to the adjacent structures as well. As outlined by Pinnacle building dust explosions in mills is a known hazard and both hardware (eg. design for containment and electrics and instruments rated for hazardous zones) and safety management

systems (eg. housekeeping) are required to lower the risk to an acceptable level. These measures are used in the existing mill to lower the risk of propagation.

Societal Risk

According to Pinnacle the risk of fatality arising from the modified Flour Mill does not extend significantly from the equipment and is therefore well away from the residential areas. The concept of societal risk applying to residential population or other off-site receptors is therefore not applicable for the modified mill.

Risk to the Biophysical Environment

The main concern for risk to the biophysical environment is generally with effects on whole systems or populations.

As there are no Dangerous Goods associated with the modified mill, significant environmental impact is not expected. Whilst fires can also effect the environment due to combustion products, these events are low likelihood given the history of these types of processes. Importantly, any spilt material will be contained in the area or via the environmental farm.

Whereas any adverse effect on the environment is obviously undesirable, according to Pinnacle the risk of losses of containment impacting the environment is broadly acceptable.

From the analysis carried out by Pinnacle, no incident scenarios were identified where the risk of whole systems or populations being affected by a release to the atmosphere, waterways or soil is intolerable.

Transport Risk

There are no Dangerous Goods involved with the modified mill.

Currently, wheat is delivered to the site four times per week in rail hopper cars nominally of 60 tonne capacity. Each train delivers approximately 2,100 tonnes of wheat.

The expansion will require an additional 3,375 tonnes per week of wheat grain to feed the modified Flour Mill, ie. approximately an extra three trains every two weeks.

This will be offset, however, by a reduction in the amount of flour exported (2,700 tonnes per week) to the Company's other flour mills, ie. a reduction in the amount of flour leaving Shoalhaven Starches being the equivalent of just more than one train carrying flour per week. The net effect of this is an overall increase in rail freight of up to 675 tonnes per week to the site.

Given this low frequency impact for a non-Dangerous Good (i.e. wheat grain), transport risk is deemed broadly acceptable.

8.1.3 Conclusion and Recommendations

The PHA prepared by Pinnacle in relation to the proposed modifications to the existing flour mill concludes:

> *The risks associated with the proposed modified flour mill at the Shoalhaven Starches Bomaderry site have been assessed and compared against the DoP risk criteria.*
>
> *In summary:*
>
> - *The potential hazardous events associated with the modified flour mill are dust explosions and smouldering fires. Given the nearest public land is approximately 120 m away and the river is 20 m away and the equipment is explosion protected well above ground level then no adverse off-site impacts are expected;*
> - *All risk criteria in HIPAP 4 is expected to be satisfied for this development;*
> - *Propagation to neighbouring equipment is not expected given that the potential dust explosions are either to be vented to atmosphere at a safe, elevated location or of limited consequential impact and the potential fires are of a smouldering nature; and*
> - *Societal risk, environmental risk and transport risk are all considered to be broadly acceptable.*
>
> *The recommendations included in the Hazardous Event Word Diagram (in this report) will require addressing as part of the design for the modified flour mill. There are no other recommendations from the assessment performed in this PHA.*

8.2 NOISE IMPACTS

The area surrounding Shoalhaven Starches is a mix of commercial, industrial and residential premises with vacant land, owned by the Manildra Group, to the north.

The nearest residential locations to the complex are as follows:

- Location 1 – Nobblers Lane, Terara approximately 1400 metres to the south east;
- Location 2 – Riverview Road, Nowra approximately 975 metres to the south west;
- Location 3 – Meroo Street, Bomaderry approximately 620 metres to the north west;
- Location 4 – Coomea Street, Bomaderry approximately 750metres to the north west.

The Shoalhaven Starches site, surrounding area and receptor locations are shown in **Figure 5.**

Figure 5: Location plan and closest receptors to Subject Site as per EPL (Day Design Pty Ltd).

The Environmental Assessment Requirements as issued by the NSW DoPE for this project require noise impacts associated with the proposal to be addressed.

> ***Noise*** *- a noise impact assessment in accordance with the Industrial Noise Policy (EPA 2000) that assesses the potential operational noise impacts of the proposal. The noise impact assessment should identify whether the proposal will comply with the existing noise limits in the EPL and if not, provide details of all reasonable and feasible mitigation measures that will be implement to ensure compliance. Potential construction noise impacts should be assessed and determined in accordance with the provisions of the Interim Construction Noise Guideline (DECC 2009).*

This Modification Application is supported by a Noise Impact Assessment prepared by Day Design Pty Ltd. A copy of the Noise Impact Assessment prepared by Day Design forms **Annexure 6** to this EA. This section of the EA is based upon the findings of this assessment.

8.2.1 Acoustic Criteria

NSW EPA Requirements

In their email response to a request for information relating to requirements to be addressed in preparing a modification application, correspondence dated 8 September 2015, the NSW EPA states:

> *"Noise Impacts:*
>
> *It is recommended that a noise impact assessment in accordance with the Industrial Noise Policy (EPA 2000) be prepared that assesses the potential operational noise impacts of the proposal.*
>
> *The noise impact assessment should identify whether the proposal will comply with the existing noise limits in the EPL and if not, provide details of all reasonable and feasible mitigation measures that will be implement to ensure compliance.*
>
> *Potential construction noise impacts should be assessed and determined in accordance with the provisions of the Interim Construction Noise Guideline (DECC 2009)."*

Protection Licence 883

Shoalhaven Starches operates under Environment Protection Licence 883 issued by the NSW Environment Protection Authority.

Section L5 'Noise Limits' of the licence states:

> *"L5.1 the $L_{A10\ (15min)}$ sound pressure level contribution generated from the premises must not exceed the following levels when measured at or near the boundary of any residential premises:*
>
> *a) 38 dBA at locations in Terara on the south side of the Shoalhaven River;*
>
> *b) 38 dBA at locations in Nowra on the south side of the Shoalhaven River;*
>
> *c) 42 dBA at locations in Meroo Street, Bomaderry;*
>
> *d) 40 dBA at other locations in Bomaderry."*

These noise limits apply to the overall operation of the Shoalhaven Starches complex.

Shoalhaven Starches Noise Management Plan

The Project Approval for the SSEP required the preparation of a Noise Management Plan for addressing and managing noise emission from the expansion project.

The Shoalhaven Starches Noise Management Plan originally prepared 31 October 2009 and revised 7 September 2010 addresses, among other things, acoustic criteria relating to the Shoalhaven Starches complex and any new developments. Section 3 of the plan

lists noise limits from the Environmental Protection Licence as shown in Section 4.1 above and states:

> *"Compliance testing conducted on a regular basis on behalf of the Mill [Shoalhaven Starches complex] has found noise emission from the premises satisfies the EPA criteria as a result of works on the Shoalhaven Starches site. In order to ensure that there is no increase in noise emission from the subject premises, with respect to the noise criteria nominated by the EPA in License Condition 6.3 [now 5.1], the design goal for such additional plant should be at least 10 dB below the criteria nominated by the EPA."*

EPA Construction Noise Guideline

The NSW EPA published the *Interim Construction Noise Guideline* in July 2009. While some noise from construction sites is inevitable, the aim of the Guideline is to protect the majority of residences and other sensitive land uses from noise pollution most of the time.

The Guideline presents two ways of assessing construction noise impacts; the quantitative method and the qualitative method.

The quantitative method is generally suited to longer term construction projects and involves predicting noise levels from the construction phase and comparing them with noise management levels given in the guideline.

The qualitative method for assessing construction noise is a simplified way to identify the cause of potential noise impacts and may be used for short-term works, such as repair and maintenance projects of short duration.

In this instance the entire construction phase may take several months although significant noise producing aspects, such as piling, if required, will last a total of approximately two weeks. Consideration is given to the potential for noise impact from construction activities on residential receptors in Section 8.2.3 below.

Table 2 in Section 4 of the Guideline sets out noise management levels at affected residences and how they are to be applied during normal construction hours. The noise management level is derived from the rating background level (RBL) plus 10 dB in accordance with the Guideline. This level is considered to be the 'noise affected level' which represents the point above which there may be some community reaction to noise.

Day Design has carried out numerous noise surveys in Nowra, Bomaderry and Terara and has found daytime background noise levels range between 33 and 40 dBA depending on the location, as shown in **Table 4** below.

Table 4

Rating Background Levels

Noise Measurement Location	*Time Period*	*Rating Background Level*
135 Terara Road, Terara March 2012	Day (7:00 am to 6:00 pm)	**33 dBA**
55 Terara Road, Nowra February 2015	Day (7:00 am to 6:00 pm)	**36 dBA**
Cambewarra Road, Bomaderry July 2010	Day (7:00 am to 6:00 pm)	**40 dBA**
Shoalhaven Village Caravan Park, Nowra - March 2012	Day (7:00 am to 6:00 pm)	**40 dBA**

For the purpose of determining the potential for community reaction to noise emission from construction activities, previously measured background noise levels in the vicinity of each receptor location have been used to determine the noise management levels as shown in **Table 5** below.

Table 5

L_{eq} Noise Management Levels from Construction Activities

Receptor Location	*Noise Management Level*	*How to Apply*
Location 1 (Terara)	**43 dBA** (33 + 10)	The noise affected level represents the point above which there may be some community reaction to noise. ▪ Where the predicted or measured $L_{Aeq\ (15\ min)}$ noise level is greater than the noise affected level, the proponent should apply all feasible and reasonable***** work practices to meet the noise affected level. ▪ The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
Location 2 (Nowra)	**50 dBA** (40 + 10)	
Locations 3 & 4 (Bomaderry)	**50 dBA** (40 + 10)	
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. ▪ Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences) 2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

***** Section 6, "work practices" of *The Interim Construction Noise Guideline*, states:

> *"there are no prescribed noise controls for construction works. Instead, all feasible and reasonable work practices should be implemented to minimise noise impacts.*
>
> *This approach gives construction site managers and construction workers the greatest flexibility to manage noise".*

Definitions of the terms feasible and reasonable are given in Section 1.4 of the Guideline.

The 'highly noise affected' level of 75 dBA represents the point above which there may be strong community reaction to noise. This level is provided in the Guideline and is not based on the RBL.

Project Specific Noise Criteria

Day Design indicate the most stringent noise criteria for the proposed modification are as follows:

Operational Phase (Environment Protection Licence noise limits less 10 dB)

- *28 dBA ($L_{10,\ 15\ minute}$) at locations in Terara on the south side of the Shoalhaven River;*
- *28 dBA ($L_{10,\ 15\ minute}$) at locations in Nowra on the south side of the Shoalhaven River;*
- *32 dBA ($L_{10,\ 15\ minute}$) at locations in Meroo Street, Bomaderry;*
- *30 dBA ($L_{10,\ 15\ minute}$) at other locations in Bomaderry.*

Construction Phase Noise Management Levels

- *43 dBA ($L_{eq,\ 15\ minute}$) at locations in Terara;*
- *40 dBA ($L_{eq,\ 15\ minute}$) at locations in Bomaderry and Nowra.*

The residential criteria apply at the most-affected point on or within the residential property boundary or, if that is more than 30 metres from the residence, at the most-affected point within 30 metres of the residence. For upper floors, the noise is assessed outside the nearest window.

8.2.2 Flour Mill Modification Operational Noise Emission

Plant and Equipment Noise Levels

The main sources of noise associated with the modification to the Flour Mill will be the four (4) extraction fans, roller mills, sifter, conveyors and bucket elevators.

Day Design Pty Ltd has conducted several noise surveys at Shoalhaven Starches' complex including noise measurements of plant and equipment within and around the existing Flour Mill. In addition, the manufacturers of the proposed fans have supplied sound levels for each model.

Table 6 below provides a schedule of the octave band and overall 'A' frequency weighted sound power levels, in decibels re: 1 pW, of noise sources associated with the modification.

Table 6

L_{10} Sound Power Levels – Grain Silos

Mechanical Plant	***dBA***	***Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)***							
		63	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***
Fan – 160-040030-00	**93**	120	120	118	118	113	108	102	96
Fan – 160-016030-00	**99**	112	115	116	117	111	104	96	85
Fan – 031-018030-00	**87**	102	102	100	99	94	89	84	78
Fan – 035-007530-00	**82**	100	99	97	97	92	87	81	75
Roller Mill	**83**	97	99	104	105	95	89	85	82
Sifter	**83**	94	94	94	93	87	83	80	78
Bucket Elevator	**88**	91	89	90	89	87	88	85	86
Chain Conveyor	**88**	86	85	83	80	79	81	78	69

Predicted Noise Levels

Knowing the sound power level of a noise source, the sound pressure level (as measured with a sound level meter) can be calculated at a remote location using suitable formulae to account for building envelope transmission, distance losses, sound barriers, etc.

Predicted noise levels at each receptor from the plant and equipment associated with the proposed modification are presented below in **Table 7** below.

Table 7

Predicted Noise Levels at Receptor Locations – Flour Mill Modification

Description	***Predicted Noise Level $L_{10,\ 15\ minute}$ (dBA)at Receptor Location***			
	Location 1	***Location 2***	***Location 3***	***Location 4***
Fan – 160-040030-00	18	21	25	23
Fan – 160-016030-00	18	21	25	23
Fan – 031-018030-00	13	16	20	18

Table 7 (continued)

Description	***Predicted Noise Level $L_{10,\ 15\ minute}$ (dBA)at Receptor Location***			
	Location 1	***Location 2***	***Location 3***	***Location 4***
Fan – 035-007530-00	10	14	17	16
Roller Mill and Sifter	18	20	22	21
Elevators and Conveyors	17	20	24	22
Combined	**24**	**27**	**31**	**29**
Acceptable Noise Limit ($L_{10,\ 15\ minute}$)	28	28	32	30
Complies	✓	✓	✓	✓

The above calculations and predictions consider distance loss to each receptor and the following:

- *Transmission loss through the Flour Mill building for the roller mills and sifter;*
- *Flour mill building of masonry (concrete) construction;*
- *Bucket elevator main motors located within the building; and*
- *Silencers fitted to each of the fans.*

8.2.3 Construction Noise Emission

The construction process will involve manoeuvring the items of plant and equipment in to place within the building using an internal hoist already in place. Externally mounted equipment will be lifted to the rooftop via an electric tower crane also already in place on site. Prior to the placement of internal plant, penetrations will be cut into the floors where required using a concrete saw.

Noise emission from the construction phase will be inaudible at each receptor, particularly as the majority of work will occur within the masonry mill building.

However, for the purpose of predicting noise emission from construction activities, for completeness, Day Design have modelled use of the concrete saw with a sound power level of 116 dBA, to each receptor location.

Table 8 below shows the predicted level of noise emission from construction activities at each of the receptor locations.

Table 8

Predicted Noise Levels at Receptor Locations – Construction Phase

Description	***Predicted Noise Level $L_{eq,\ 15\ minute}$ (dBA) at Receptor Location***			
	Location 1	***Location 2***	***Location 3***	***Location 4***
Construction Activity	**20**	**23**	**26**	**25**
Acceptable Noise Limit ($L_{eq,\ 15\ minute}$)	43	50	50	50
Complies	✓	✓	✓	✓

8.2.4 Noise Control Recommendations

Fan Silencers

It is proposed to fit each of the fans with silencers. Day Design recommend fitting silencers to the discharge side of each fan. Each of the silencers should achieve the minimum insertion losses shown in **Table 9** below.

Table 9

Silencer Insertion Losses

Description	***Minimum Insertion Loss (dB) at Octave Band Centre Frequencies (Hz)***							
	63	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***
Fan – 160-040030-00 Silencer - NAP Silentflo H45/240	11	19	33	45	43	29	20	17
Fan – 160-016030-00 Silencer - NAP Silentflo H45/180	8	15	25	35	34	23	17	14
Fan – 031-018030-00 Silencer - NAP Silentflo H45/90	3	9	13	20	20	14	14	9
Fan – 035-007530-00 Silencer - NAP Silentflo H45/90	3	9	13	20	20	14	14	9

8.2.5 Conclusion

Day Design conclude in their assessment that:

> *"Calculations show that the level of noise emission from the operation of the plant and equipment associated with the modification will be within the noise design goals derived from Environment Protection Licence 883 noise limits at each receptor location. This is providing noise control recommendations made in Section 7 of this report* [i.e. fan silencers] *are implemented.*
>
> *Noise emission from the construction phase of the proposal will be well below noise management levels set in accordance with the NSW EPA's Interim Construction Noise Guideline at all receptor locations."*

8.3 AIR QUALITY (INCLUDING ODOUR IMPACTS)

The Environmental Assessment Requirements as issued by the NSW Department of Planning & Environment (DoPE) for this project require:

> ***Air quality and odour*** *- an air quality impact assessment in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC 2005). This should include specific assessment of potential odour and total suspended particle impacts from the proposal and detail whether the existing pollution controls, such as the flour mill bag houses at the premises have sufficient capacity to deal with the proposed expansion. Where any exceedances of the relevant air quality assessment criteria are identified, the air quality impact assessment report should detail all reasonable and feasible mitigation measures that will be implemented to ensure compliance.*

This proposal does not rely upon the use of the existing pollution controls as suggested in the above requirement. Additional exhausts will extend from two new baghouses. This was raised with the Department following the issue of the original requirements.

In response the Department approached the EPA who responded in an email dated 21st September 2015 indicating that they had no issues with this approach (**Annexure 2**).

This Modification Application is supported by an Air Quality Impact Assessment (AQIA) prepared by Stephenson Environmental Management Australia (SEMA) in response to the above requirement issued by the Department (and subsequently modified). A copy of SEMA's AQIA forms **Annexure 5** to this EA. This section of the EA is based upon the findings of this assessment.

8.3.1 Impact Assessment Criteria

Odour Impact Assessment Criteria

The *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (AMMAAP) provides a Ground Level Concentration (GLC) impact assessment criterion for a number of potential air emissions. This method states that dispersion modelling undertaken should assess the modelling predictions against the GLCs to determine if the predicted impact from the emissions exceeds the criteria.

The Impact Assessment Criteria (IAC) for complex mixtures of odours have been designed to take into account the range of sensitivity to odours within the community and to provide additional protection for individuals with a heightened response to odours. This is achieved by using a statistical approach dependent upon population size. As the population density increases, the proportion of sensitive individuals is also likely to increase, indicating that more stringent criteria are necessary in these situations.

The GLC assessment criteria for the complex odour compound emissions considered in the modelling are shown in **Table 10**. The predicted odour impact due to the pollutant source must be reported in units consistent with the IAC as peak concentrations (ie. approximately 1 second average).

The odour criterion that has been selected for use in this assessment, to determine the maximum odour GLC concentration from the proposed modifications to the Flour Mill, is the 2.0 odour units (ou) criterion for the 100th percentile of predicted odour concentrations, which indicates that 100 percent of all odour predictions would fall below this concentration. This criterion has been chosen because there are residential areas in the vicinity of the Shoalhaven Starches facility, such that the population density of the area surrounding the facility as a whole is expected to be in excess of 2000 people.

Table 10

Impact Assessment Criteria for Complex Odorous Air Pollutants

Population of affected community	***Impact Assessment Criteria (ou)***
Urban (> 2000) and/or schools and hospitals	2.0
~ 500	3.0
~ 125	4.0
~ 30	5.0
~ 10	6.0
~ single rural residence (<= 2)	7.0

Key: ou = odour unit
> = greater than
> = less than

Adjustment for Peak-to-Mean Ratios

AMMAAP notes that the evaluation of odour impacts requires the estimation of short or peak concentrations on the time scale of less than one second. The dispersion modelling predictions are valid for one-hour ground level concentrations or longer. Therefore according to SEMA the dispersion model, such as AERMOD, needs to supplemented to accurately simulate atmospheric dispersion of odours and the instantaneous perception of odours by the human nose.

AMMAAP Table 6.1, reproduced in **Table 11** below, provides EPA recommended one-second to one-hour (P/M60) peak-to-mean ratios for estimating concentrations for different source types, stabilities and distances. According to SEMA it is important to note that these emission factors are for idealised situations for one source in flat terrain where the receptor is located along the centreline of the single plume and do not

consider fluctuations away from the plume centre line, terrain influences or plume interactions from multiple sources.

AMMAAP further requires that the P/M60 ratio for wake-affected point sources be applied to the proposed additional Flour Mill stacks to determine the maximum permissible stack concentration. Therefore, maximum permissible stack source emission rate will need to be multiplied by 2.3 when checking for compliance with the ambient odour GLC criterion.

Table 11

Peak-to-Mean Factors

Table 6.1: Factors for estimating peak concentrations in flat terrain (Katestone Scientific 1995 and 1998)

Source type	Pasquill–Gifford stability class	Near-field P/M60*	Far-field P/M60*
Area	A, B, C, D	2.5	2.3
	E, F	2.3	1.9
Line	A–F	6	6
Surface wake-free point	A, B, C	12	4
	D, E, F	25	7
Tall wake-free point	A, B, C	17	3
	D, E, F	35	6
Wake-affected point	A–F	2.3	2.3
Volume	A–F	2.3	2.3

* Ratio of peak 1-second average concentrations to mean 1-hour average concentrations

Source: Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales

TSP Impact Assessment Criteria

The AMMAAP criterion for Total Suspended Particulate Matter is outlined in **Table 12.**

Table 12

Impact Assessment Criteria for Total Suspended Particulate Matter

Pollutant	*Averaging Period*	*Impact Assessment Criteria (µg/m³)*	*Source*
TSP	Annual	90	NHMRC (1996)

Key: TSP = Total suspended particulate matter µg/m³ = micrograms per cubic metre
NHMRC = National Health and Medical Research Council

8.3.2 Dispersion Modelling Input Data

According to SEMA AERMOD is a recommended Gaussian dispersion modelling system as it accurately estimates GLC's of source emissions. AERMOD requires the following input data – meteorological, buildings and structures on site, surrounding terrain data, discrete receptors and emissions and source information. These are all detailed in this section.

Terrain Input Data

The terrain surrounding the Shoalhaven Starches site ranges from flat terrain in the immediate vicinity to mountains between 100 and 200 metres above sea level in approximately 5km north-west of the plant. The township of Bomaderry, west of Shoalhaven Starches exists in moderately hilly terrain with slopes ranging from approximately 20 to 50 metres above sea level. The Shoalhaven River extends eastward from the south-east of the area under consideration, with a resultant river valley between Bomaderry and Nowra. The terrain is relatively flat around the river for the area east of Bomaderry.

Meteorological Input Data

The area considered in AQIA dispersion modelling experiences according to SEMA typical coastal weather in addition to locally influenced patterns. A mountain range to the north of the site means northerly winds are much less common than the east-west wind patterns occurring as a result of the coastal sea breeze cycle. The meteorological (MET) file was provided by Lakes Environmental Met Data Services and included hourly data for temperatures, wind speed, wind direction, and mixing heights from January 1st to December 31st 2013.

Figure 6 presents this wind data. The arms in the figure represent the direction from which the wind is blowing and shows that westerlies and north westerlies were the most predominant for the 12 month period, which was considered typical meteorological data.

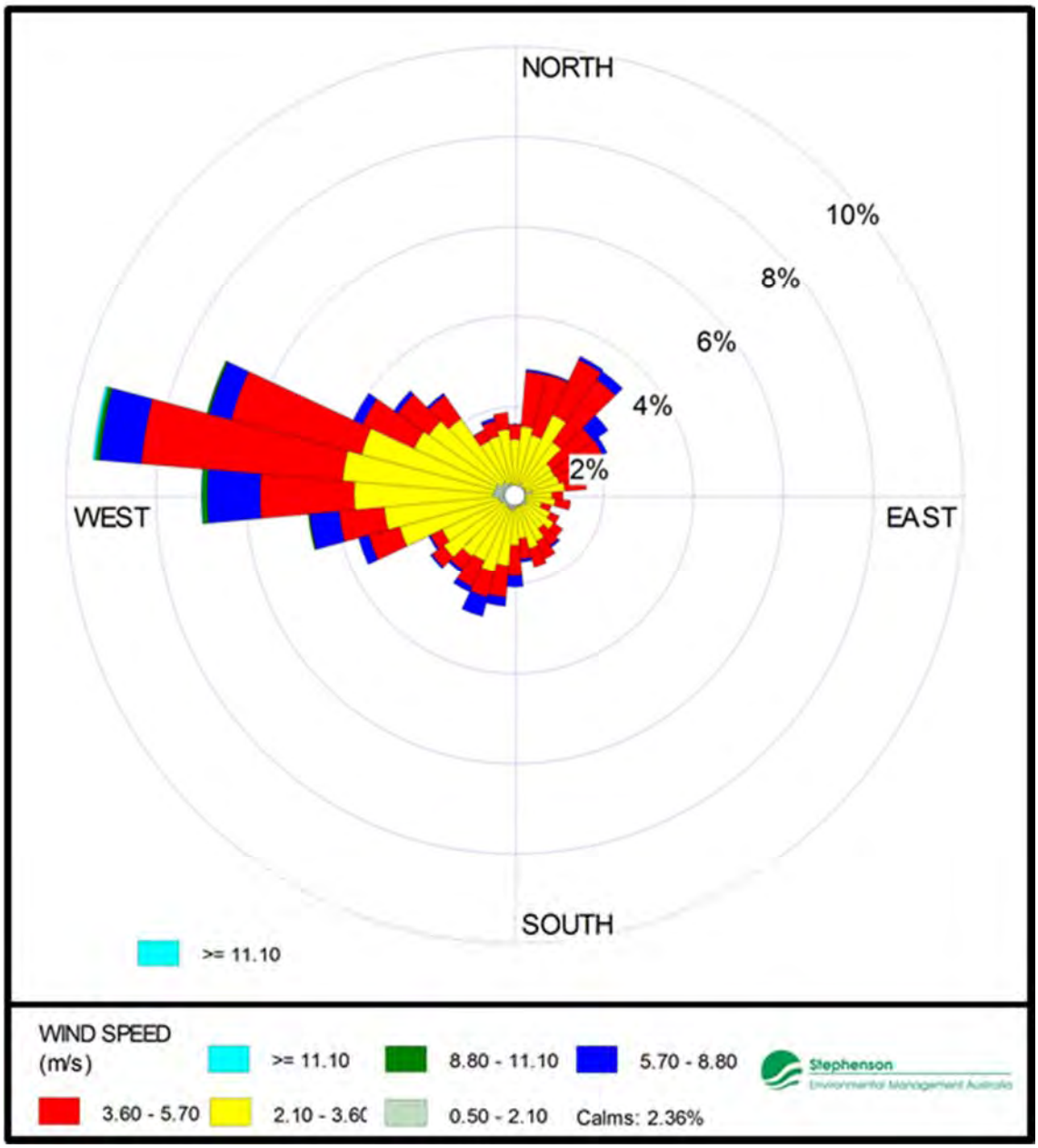

Figure 6: Wind Rose – January 1st –December 31st 2013

Building Input Data

Buildings greater than 0.4 times the height of stack and within a distance of 5L must be incorporated into modelling, where L is the lesser of the height or width of the building. The Flour Mill has two tiers at heights of 30.9 and 32 metres above ground, and a total width of 32 metres. The proposed stacks have heights of 31.8 and 33.4 metres above the ground. The buildings incorporated into the modelling assessment were the existing Flour Mill buildings and silos, flour unloader, starch buildings, DDG building, packaging building and the boiler house. **Figure 7** presents the building profile incorporated into the modelling assessment.

Figure 7: Building Input Data

Receptors of Interest

The receptors of interest chosen for this assessment were reflective of those chosen in the 2008 GHD Air Quality Impact Assessment. The receptors selected included four (4) residential areas, which are Bomaderry, North Nowra, Nowra and Terara. These areas are highlighted in **Figure 8**. For this AQIA, SEMA, the highest odour and TSP GLCs in each of these areas was observed and included in this report, to compare with the 2008 GHD assessment.

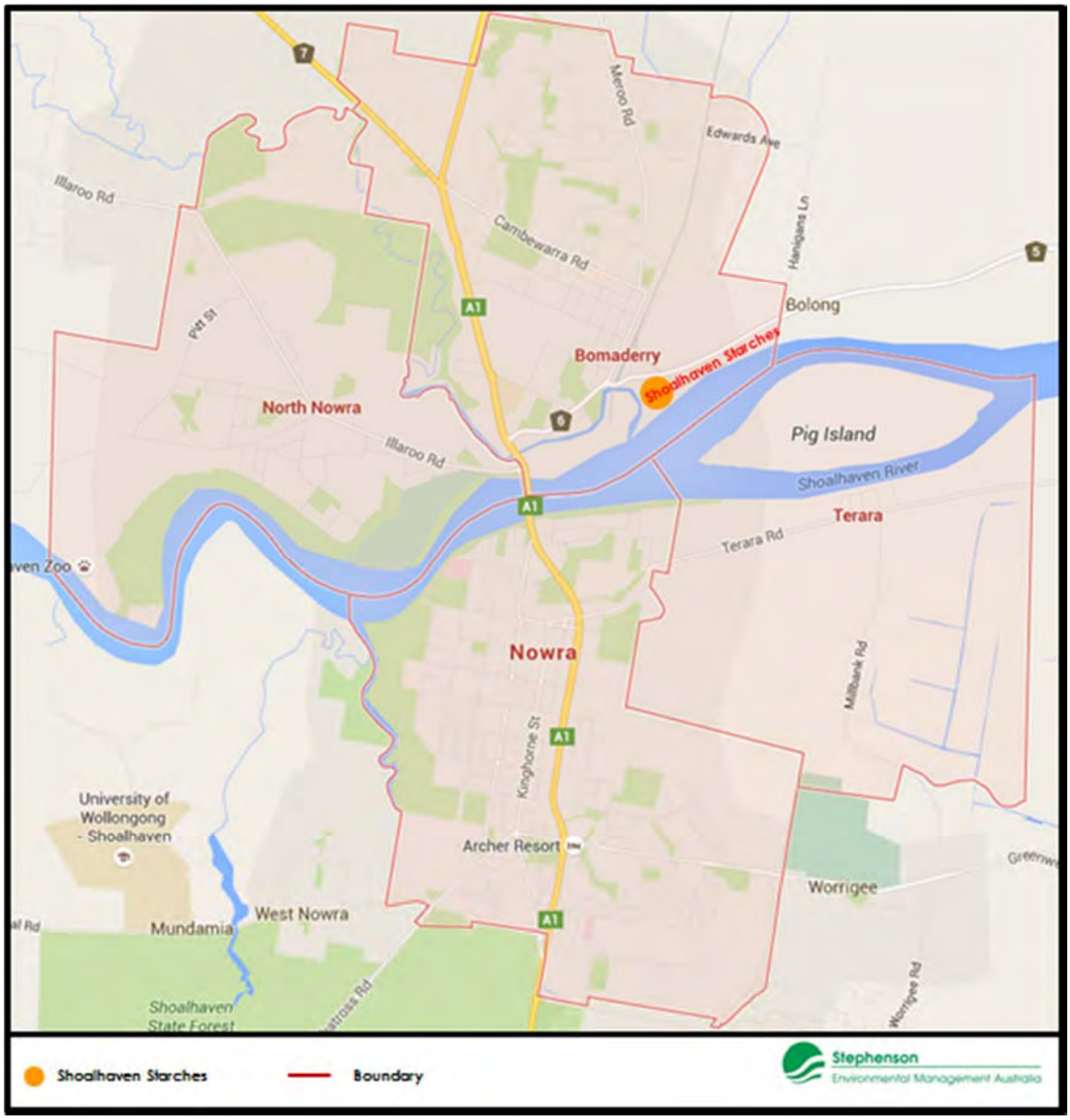

Figure 8: Receptors of Interest Locations

Emission Input Data

Stack emission input data was derived from two sources. The Manildra Group provided proposed stacks information including function, stack locations, dimensions and expected flow rate. SEMA conducted emissions monitoring tests, including odour and TSP on the existing Flour Mill exhaust stacks, and used the resulting concentrations and exhaust temperatures as input data. TSP and odour concentrations were derived from emission results from tests conducted in September 2011 on four stack exhaust points servicing the existing Flour Mill. The correlation between stacks on the existing and modified Flour Mill is shown in **Table 13**. **Table 14** presents dimensions and flow rates

for the two proposed stacks. Mass emission rates for TSP and odour were calculated based on data presented in **Tables 15** and **16**.

Table 13

Emission Concentrations and Temperatures – Proposed Modified Flour Mill

Existing Stack ID	*Proposed Stack ID*	*TSP Emission Concentration*	*Odour Emission Concentration*	*Exhaust Temperature*
1	6	0.113 mg/m^3	77 ou	27.1 °C
3	7	0.106***** mg/m^3	168 ou*****	49.0 °C

Table 14

Physical Emission Data – Proposed Modified Flour Mill

Proposed Stack ID	*Stack Height*	*Stack Exit Diameter*	*Normal Flow Rate*	*Exit Velocity*
6	33.4 m	0.90 m	2.7 Nm^3/s	4.17 m/s
7	31.8 m	0.68 m	1.6 Nm^3/s	4.4 m/s

Table 15

TSP Emission Rate Input Data

Proposed Stack ID	*Parameter*	*Averaging Time*	*Concentration*	*TSP Mass Emission Rate*
6	TSP	Annual	0.113 mg/m^3	0.0003 g/s
7	TSP	Annual	0.106 mg/m^3	0.0002 g/s

Table 16

Odour Emission Rate Input Data

Proposed Stack ID	*Parameter*	*Concentration*	*Total Odour MER*	*Peak to Mean Ratio*	*Corrected Total Odour MER*
6	Odour	77 ou	205 ou.m^3/s	2.3	472 ou.m^3/s
7	Odour	168 ou	266 ou.m^3/s	2.3	612 ou.m^3/s

Key to Tables 12 to 15

ou = *odour units.*
m = *metres.*
g/s = *grams per second*
TSP = *total suspended particulates*
***** = *Not tested 09/2011. Manildra expect emissions to be same as existing stack 5.*
mg/m^3 = *milligrams per cubic metre @ 0 C and one atmosphere pressure.*
Nm^3/s = *cubic metres per second corrected to 1 atmospheric pressure and 273 Kelvin.*
°C = *Degrees Celsius.*
m/s = *metres per second*
ou/m^3/s = *odour units per cubic metre per second*

Cumulative Odour Emissions

With the existing level of odour control, according to SEMA the proposed modification to the existing Flour Mill is not considered to make a significant contribution to the factory's total cumulative odour impact.

The 2008 air quality assessment carried out by GHD (Shoalhaven Starches – Report on Ethanol Upgrade Air Quality Assessment), estimated that the total odour emissions from the Shoalhaven Starches factory before implementation of odour controls is 604,811 ou.m^3/s. Based on available data and measurement results, SEMA has estimated that the proposed modifications to the existing Flour Mill will emit a combined 1,084 ou.m^3/s of odour into the atmosphere. This is an additional 0.2% of total odour emissions from the Shoalhaven Starches factory complex at Bomaderry.

After the implementation of additional odour controls (AOC), the proposed modified Flour Mill will appear to have an apparent larger contribution to the factory's cumulative odour impact. This, according to SEMA, is an artefact caused by the significant decrease in overall odour emissions from the factory complex after the implementation of these additional odour controls nominated in the 2008 GHD assessment report.

The GHD study has estimated that the total odour emissions for the factory complex will be reduced to 155,393 ou.m^3/s after the completion of Stage 2 odour controls and 148,807 ou.m^3/s after the completion of Stage 3 odour controls.

However, the total odour emissions from the additional stacks serving the proposed modified Flour Mill were not included in the original GHD study. These additional emissions from the modified Flour Mill have been assumed by SEMA modelling to be worst case; that is, to remain at 1,084 ou.m^3/s which is an additional 0.7% of total odour emissions from the factory after the completion of AOC). Hence, the apparent relative increase in odour contribution over the aforementioned 0.2%.

Cumulative TSP Emissions

According to SEMA the proposed modified Flour Mill is not considered to make a significant contribution to the factory's total cumulative impact for TSP.

The GHD study estimated that the total TSP emissions from the Shoalhaven Starches factory complex is 13.3 g/s. Based on available data and measurement results, SEMA has estimated that the proposed modified Flour Mill will emit a combined 0.0005 g/s of TSP into the atmosphere. This is an additional 0.004% of total TSP emissions from the Shoalhaven Starches factory complex in Bomaderry.

8.3.3 Impact Assessment Predictions and Cumulative Impacts

The air quality impact assessment predictions, from the dispersion modelling, for TSP and odour respectively are presented in **Tables 17** and **18**. GHD predicted impact ground level concentrations have been drawn from Tables 8-2 (odour) and 8-3 (TSP) of their Ethanol Upgrade Air Quality Assessment report.

Table 17
Cumulative Worst Case Predicted TSP GLC

Location	*Parameter*	*Averaging Time*	*Modified Flour Mill* GLC (µg/m³)*	*Whole Factory ** GLC (µg/m³)*	*Impact Assessment Criteria (µg/m³)*
Worst case	TSP	Annual	0.17	-	90
Bomaderry	TSP	Annual	0.10	2	90
North Nowra	TSP	Annual	0.05	1	90
Nowra	TSP	Annual	0.05	1	90
Terara	TSP	Annual	0.05	1.5	90

Key to Tables 16 and 17:

*****	=	*SEMA prediction (2015)*	******	=	*GHD 2008 Ethanol Upgrade predictions (2008)*
ou	=	*odour units*	*µg/m³*	=	*micrograms per cubic metre*
GLC	=	*Ground Level Concentration*	*sec*	=	*second*
TSP	=	*Total Suspended Particulate Matter*			

Table 18
Cumulative Worst Case Predicted Odour GLC

Location	*Parameter*	*Averaging Time*	*Modified Flour Mill Contribution* to GLC (ou)*	*Whole Factory Predicted Impacts on GLC** (ou)*	*Impact Assessment Criteria (ou)*
Factory north-west boundary	Odour	1 sec. (using peak-to-mean ratio)	0.26	~25 (MOC) ~10 (AOC) ~5 (AOC)	2.0
Bomaderry - Residential	Odour	1 sec. (using peak-to-mean ratio)	0.21	6 (MOC) 3 (AOC 2 (AOC)	2.0
North Nowra	Odour	1 sec. (using peak-to-mean ratio)	0.13	3 (MOC) 2 (AOC) 1 (AOC)	2.0
Nowra	Odour	1 sec. (using peak-to-mean ratio)	0.11	5 (MOC) 3 (AOC) <2 (AOC)	2.0
Terara	Odour	1 sec. (using peak-to-mean ratio)	0.11	5 (MOC) 3 (AOC) <2 (AOC)	2.0

Figures 9 and **10** present the aerial view of the predicted TSP and odour concentrations respectively.

Figure 9: Predicted TSP concentration.

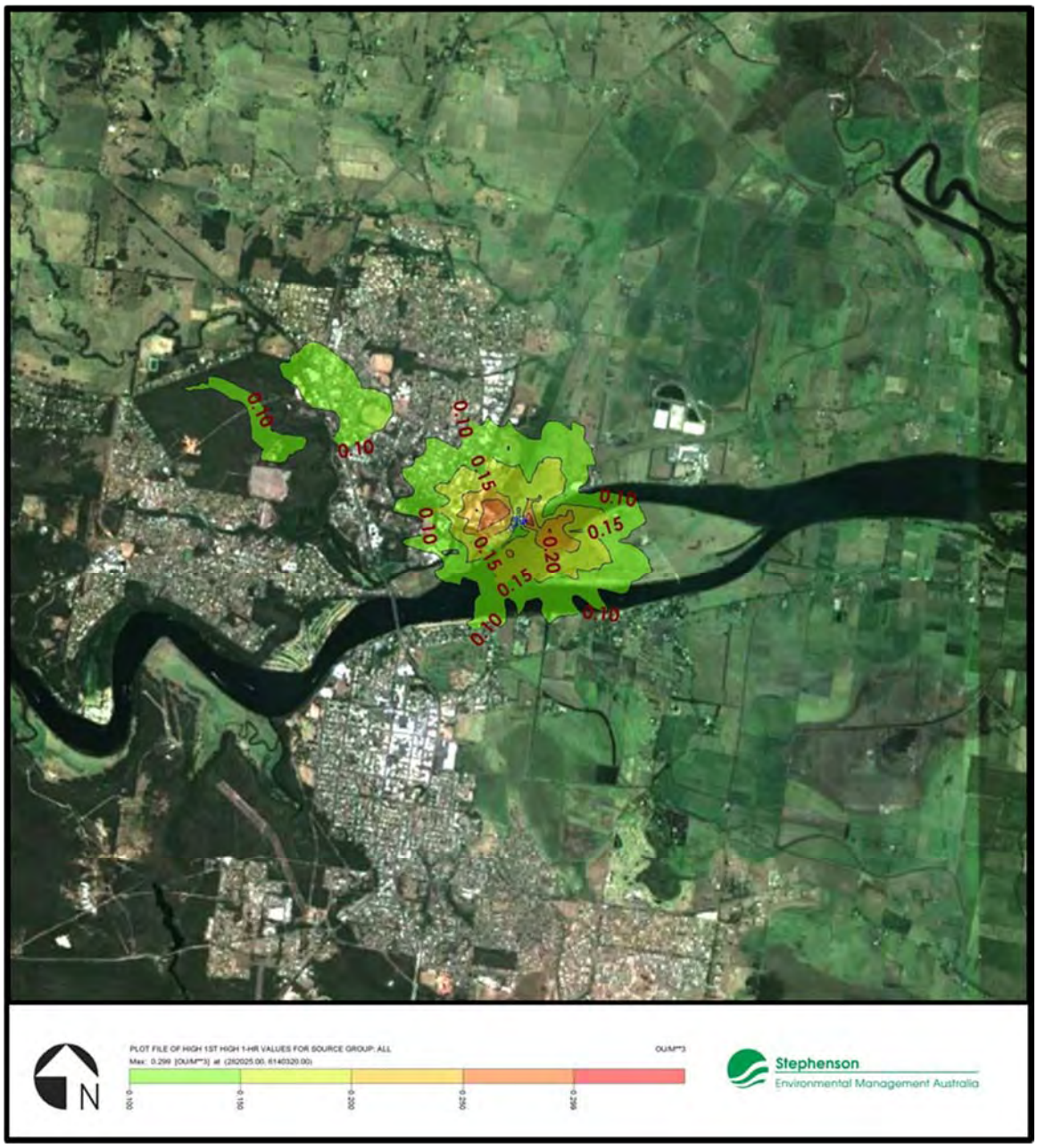

Figure 10: Predicted odour concentration.

The potential cumulative impact associated with the operation of the proposed modified Flour Mill is potentially higher than the existing concentrations. However according to SEMA, TSP emissions are still predicted to be below the relevant criteria. The maximum TSP ground level concentration is predicted to be 0.17 µg/m^3.

Odour ground level impacts from the stacks of the proposed modified Flour Mill alone are according to SEMA not predicted to exceed regulatory impact assessment criteria of 2 ou. The maximum odour concentration at ground level is predicted to be 0.3 ou from the additional stacks of the modified Flour Mill only. From the GHD assessment, the

total odour GLC from the Shoalhaven Starches factory was predicted to be 100 ou on the northwest boundary. The highest impact from the proposed modified Flour Mill stacks at this same location would have a GLC of 0.26 ou.

TSP ground level impacts from the stacks of the proposed modified Flour Mill alone are not according to SEMA predicted to exceed regulatory impact assessment criteria of an annual average 90 µg/m^3.

The maximum predicted worst case TSP concentration at ground level according to SEMA is 0.17 µg/m^3 on the boundary of the factory complex.

From the 2008 GHD assessment, the reported GLC at Bomaderry based on factory emission sources was predicted to be of the order of 2 µg/m^3 in the Bomaderry area. The highest impact on air quality in the Bomaderry area from the stacks serving the proposed modified Flour Mill is predicted to be 0.1 µg/m^3. The cumulative impact would still be significantly lower than the impact assessment criteria of 90 µg/m^3.

The results from the odour assessment by SEMA on the existing Flour Mill indicated a neutral hedonic tone. That is, the odour was not considered unpleasant or offensive. The odour from the proposed modified Flour Mill can also be expected to be of a similar, neutral hedonic tone.

8.3.4 Conclusions of AQIA

The AQIA carried out by SEMA in relation to this proposal made the following conclusions:

> *This Air Quality Impact Assessment predicts that the emissions of odour and particulate matter from the proposed modified flour mill complex will have the following impacts:*
>
> - *Predicted **odour** GLCs from the proposed modified flour mill will be below the IAC of 2 odour units.*
> - *Predicted worst case **TSP** GLC (annual average) from the proposed modified flour mill is 0.17 µg/m^3 which is on the site.*
> - *The cumulative **TSP** impact of the ethanol upgrade and the modification of the existing flour mill would comply with the annual IAC of 90 µg/m^3.*
> - *The SEMA **odour** emissions assessment on the existing flour mill indicates a neutral hedonic tone, that is, odour was considered neither unpleasant nor offensive. The odour from the proposed additional stacks of the flour mill can also be expected to be of a similar, neutral hedonic tone.*
>
> *Using the cumulative modelling results from the GHD 2008 Ethanol Upgrade Assessment, and assuming the odour emissions from the modified flour mill*

will remain constant through all mandatory and additional odour control stages; the following conclusions can be made:

- *On the **north western boundary** of the factory complex site, the proposed modified flour mill is predicted to have an additional impact on **odour** GLC of:*
  - *0.26 ou which equates to 1.04% of the cumulative plant odour emissions after mandatory odour controls (MOC) and 2.6% after additional odour controls (AOC).*
- *In the **Bomaderry residential area**:-*
  - *worst case GLC **odour** impact prediction from the modified flour mill stacks is 0.21 ou; which equates to 2.2% of the cumulative plant odour emissions after MOC and 3.6% after AOC.*
- *GHD (2008) **odour** impact predictions for the cumulative sources are:*
  - *25 ou at the northwest site boundary and;*
  - *6 ou at **the Bomaderry residential area with MOC;***
  - *10 ou at the northwest site boundary and;*
  - *3 ou at the **Bomaderry residential area with AOC;***

8.4 FLOODING

The Environmental Assessment Requirements as issued by the DoPE for this project required flooding impacts to be addressed by this proposal.

This Modification Application is supported by a Flood Impact Assessment report prepared by WMAwater (WMA) prepared in response to the Departments requirements. A copy of WMA's report forms **Annexure 4** to this EA. This section of the EA is based upon the findings of this assessment.

WMA have obtained flood certificate from Shoalhaven City Council which advises that the site is inundated in the 1% Annual Exceedance Probability (AEP) event and is described as part High Hazard and part Floodway. The projected sea level rise estimates due to climate change will not increase the 1% AEP flood level at this site as it is too far upstream from the ocean.

According to WMA, the existing Flour Mill is surrounded by an extensive array of existing plant and buildings. Thus the flow path of floodwaters from the Shoalhaven River over the river bank and towards Bolong Road is already significantly impeded. In addition, the majority of the proposed works are above the Probable Maximum Flood (PMF) level (all works except the proposed 3 m x 4 m building extension) and therefore their construction will have no impact on flood levels. According to WMA, construction of the

building extension will have an insignificant impact on flood levels due to the density of the surrounding existing plant and the small size of the extension.

In conclusion, WMA consider that there would be no increase in the 1% AEP flood level as a result of the proposed works.

8.5 VISUAL IMPACTS

The Shoalhaven Starches Factory Site is located on Bolong Road, one of the main gateway entrances to the Nowra/Bomaderry urban areas, and a significant tourist route along this section of the South Coast.

The Scenic Character and Environment

The Shoalhaven Starches factory site is situated on Bolong Road, the gateway to Bomaderry, within an area currently containing a mixture of rural and industrial land uses. These different land uses contrast with each other and result in a mixed visual character.

The rural areas, much of which comprises the Shoalhaven Starches Environmental Farm, are generally flat to gently undulating and planted with pasture grasses. These areas have a typical rural/agricultural character, common throughout the region. To the north and forming a background to the rural landscape are the timbered slopes of the Cambewarra escarpment.

The Shoalhaven City Council Heritage Study 1995 – 1998 prepared by Peter Freeman Pty Ltd in association with JRC Planning Services identified the rural landscapes north of the Shoalhaven River as the Berry-Bolong Pastoral Landscape. This Study described this area as:

> *"North of the Shoalhaven River the area is dominated by the close relationship between the Princes Highway (formalised by Berry in 1857/1858) and the railway (1893) which were instrumental in determining the location of new homesteads on Berry estate lands which resulted from drainage schemes implemented by Sir John Hay. In the foothills to the north-west, and towards Cambewarra, settlement patterns were in the main determined by the impact of Free Selection after 1861. Sub-zones include the Cambewarra-Tapitallee area, Bellawongarah and the catchment areas of Broughton Creek north of Berry. The latter are focused around communities which developed outside the Berry Estate: Cambewarra, Tapitallee, Bundewallah, Woodhill and Broughton Vale. The scale and character are dependent on the distribution of small dairy farms, with internal and external boundaries created by modified and natural vegetation (River Oaks), roads, creeks and property boundaries.*
>
> *Continuing dairy farms has contributed to the survival of the underlying late nineteenth and early twentieth century landscape patterns."*

The Shoalhaven Starches factory complex is characterised by typical industrial structures with an overall bulk and scale that dominates the surrounding locality. The site, despite being partially screened by vegetation along Bolong Road, the Shoalhaven River and Abernethy's Creek visually dominates the locality. The development is particularly exposed to view along Bolong Road. This view reveals some of the internal structures within the site including recovery and storage tanks, car park, fermentation tanks and the Ethanol Plant. Overall the appearance of the site is typical of an industrial facility of this nature.

The most relevant vantage points from where the overall factory site is visible would include:

The Princes Highway – views of the existing factory site are possible from selected locations along the Princes Highway north of Bomaderry, travelling in both a northerly and southerly direction. Whilst the factory site is visible in the landscape, its overall visual impact is reduced by virtue of the distance between the plant; the intermittent nature of the views; a rise in topography which screens the site from view; and vegetation.

Burraga (Pig) Island – Burraga Island is situated in the middle of the Shoalhaven River and provides the closest vantage point to the southern boundary of the site. The island however is privately owned and not accessible to the public. Vegetation screening along the riverbank adjacent to the site also reduces the visibility of the existing buildings and structures.

Bolong Road – Bolong Road runs along the frontage of the site. Views of the factory are possible when travelling in both an easterly or westerly direction. Some attempts have been made to provide some tree planting along the boundaries to "soften" the appearance of the development. The existing building forms and structures are however clearly visible to motorists travelling along this stretch of Bolong Road.

Nowra Bridge – The Nowra Bridge crosses the Shoalhaven River and provides limited opportunities for views of the factory site. The dominant visual elements from the bridge are the river, vegetation along the riverbanks and the escarpment. The visual impact of the factory site is reduced by distance as well as the bridge structure which permits only glimpses of the site.

Bomaderry urban area – The existing plant is visible from a number of locations within the eastern outskirts of Bomaderry. Bomaderry is slightly elevated and some locations within the urban area do have extensive views of the site.

Terara – Distant views of the Plant are possible from a number of vantage points in and around the village of Terara on the southern bank of the River. The visual impact of the site however is reduced by distance, the intervening landform of Burraga (Pig) Island and the vegetated riverbanks.

Riverview Road – Views of the site are available from residential development on the southern bank of the Shoalhaven River. Vegetation along both the northern and southern banks of the river partially screen the site from view.

Cambewarra Lookout – Cambewarra lookout is a popular tourist lookout providing panoramic views over the Shoalhaven floodplain and estuary. Shoalhaven Starches, like the other significant industrial sites, is visible from the lookout.

Visual Impact of Proposal

The proposal will involve the installation of additional plant largely within the confines of the existing Flour Mill building footprint and will include additional plant being located on top of the existing building. The additional roof top plant will include additional silencers in conjunction with existing silencers; as well as a bucket elevator and conveyors. A building extension between the existing Flour Mill building and adjacent silos will also be required. This extension will have a small building footprint of 3 m x 4 m, and will have an overall height of 40 m.

Under these circumstances, the proposed modifications represent only a minor change to the existing Flour Mill structure.

The visual impact of these works from the identified vantage points (refer **Figure 11**) is described as follows.

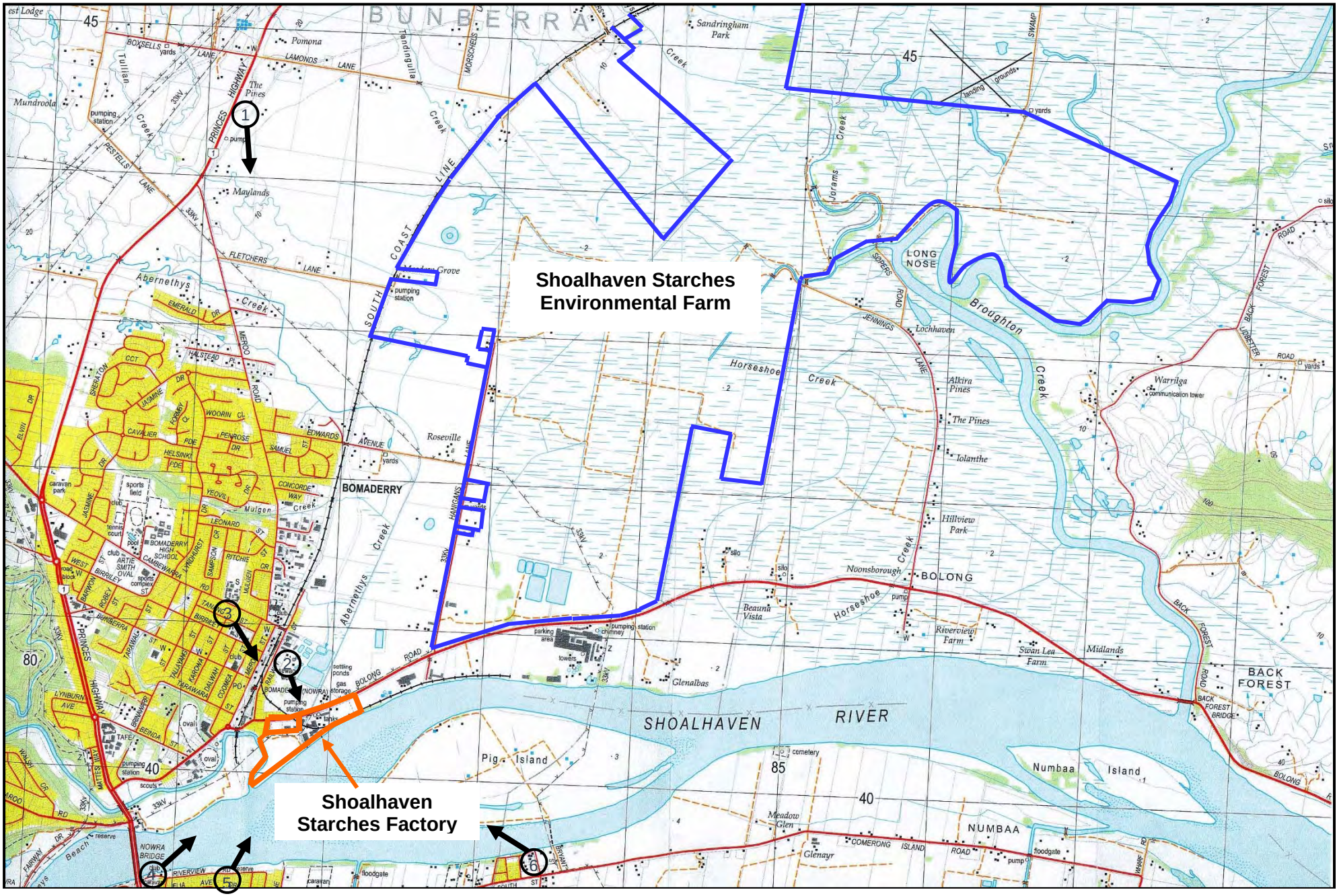

Figure 11: Vantage Points for Plates.

The Princes Highway

The Shoalhaven Starches factory is mainly visible from a section of the Princes Highway between Boxsells Lane and Devitts Lane, Jaspers Brush (refer **Plate 1**). Due to the configuration of the highway and the siting of the factory, only southbound vehicles view the site. Vantage points along this section of the highway are 4.5 to 5.0 km from the site. The site becomes less exposed and is eventually obscured by a rise in topography further south of Boxsells Lane.

Given the distance from these vantage points the factory site is only barely visible. The rising topography upon which Bomaderry is sited screens the western portion of the site, as does intervening vegetation.

Given the distance of these views, the scale and nature of the proposed modifications and the screening of the site attributed to terrain and vegetation it is considered the developments associated with this project will not impact on views from this vantage point.

Plate 1: View of Shoalhaven Starches Factory from Princes Highway (within vicinity of Boxsells Lane).

Bolong Road

The existing factory site is clearly visible from Bolong Road by vehicles approaching from the east, and along the frontage of the site refer (**Plate 2**).

However, the existing Flour Mill is largely screened from view at this location by existing development to the north and west within the factory site and by existing vegetation. This will remain unchanged as a result of the proposed modification which largely involves the installation of additional plant within the confines of the existing Flour Mill building. The proposal will also involve some additional roof top plant on the existing Flour Mill and a building extension between the existing Flour Mill building and adjacent silos, which will have a building footprint of 3 m x 4 m and an overall height of 40 m. These external modifications are not expected to be visible from this vantage point.

Under these circumstances, the vista from this vantage point will not be significantly altered by the proposed modification.

Plate 2: View of Shoalhaven Starches factory site from Bolong Road. Flour Mill barely visible from this vantage point.

Bomaderry Urban Area

The township of Bomaderry is slightly elevated and some locations within this urban area have extensive views of the site (refer **Plate 3**).

Plate 3: View of Shoalhaven Starches factory site from corner of Railway Street and Cambewarra Road, Bomaderry.

The existing Flour Mill is largely screened from view at this location by existing development to the north and west within the factory site and by existing vegetation. This proposed modification largely involves the installation of additional plant within the confines of the existing Flour Mill building. The proposal will also involve some additional roof top plant on the existing Flour Mill and a building extension between the existing Flour Mill building and adjacent silos, which will have a building footprint of 3 m x 4 m and an overall height of 40 m. These external modifications are not expected to be visible from this vantage point.

Under these circumstances, the vista from this vantage point will not be significantly altered by the proposed modification.

Nowra Bridge

The view from Nowra Bridge to the east is mainly dominated by the river, riparian vegetation and the floodplain (refer **Plate 4)**.

Plate 4: View of Shoalhaven Starches factory site from Nowra Bridge over the Shoalhaven River.

The site is largely obscured by riverside vegetation. The top of the existing Flour Mill protrudes above the canopy of the vegetation along the river, as does the existing boiler house and starch plant. The existing Flour Mill will remain unchanged externally by the proposed modifications with the exception of additional plant that is proposed to be located on the roof of the building and a building extension that is to be located between the existing Flour Mill and silos. The proposed rooftop additions (silencers, conveyor belts and bucket elevator) will not be dissimilar to existing structures already located on the roof of the Flour Mill and elsewhere within the existing Shoalhaven Starches complex. As such, the proposed rooftop additions will conform to the visual character of the site, ie. it is industrial development within an industrial setting.

The proposed building extension will have a footprint of 3 m x 4 m and an overall height of 40 m. The existing Flour Mill has a height of 32.05 m and the existing silos are 34.50 m high. As such, despite the increase in building height, the overall visual change will be minor given the small footprint of the proposed extension and that it will be viewed within the context of these existing buildings and also within the context of the broader

Shoalhaven Starches site. The broader site includes a range of different buildings and building heights including the new wet end dryer which has a height above ground level of 43 m and the boiler house which has a stack with a height of 53 m.

Under these circumstances, the proposed modifications will not be out of context in terms of the existing factory development when viewed from this vantage point.

Riverview Road

The main vantage point from where the existing Flour Mill is visible is from residences along Riverview Road directly south of the site (refer **Plate 5**). This view is from a distance of about 750 metres. Riverside vegetation along both the northern and southern banks of the river softens much of the site from view.

Plate 5: View of Shoalhaven Starches factory site from Riverview Road area.

The existing Flour Mill and flour uploader are already visible from this vantage point. The existing Flour Mill will remain unchanged externally by the proposed modifications with the exception of additional plant that is proposed to be located on the roof of the building and a building extension that is to be located between the existing Flour Mill and silos. The proposed external additions will not be dissimilar to existing structures already located within the existing Shoalhaven Starches complex and will conform to the visual character of the site. Under these circumstances, the proposed modifications will not be

out of context in terms of the existing factory development when viewed from this vantage point.

It is noted that there is scope for supplementary landscaping and revegetation to take place along the riverbank adjoining the factory site to help soften or obscure views of the site, particularly from the Riverview Road vantage point. This was addressed as part of the Project Approval for the Expansion Project.

Terara

The village of Terara is approximately 1.5 kilometres from the factory. The view of the Shoalhaven Starches factory site as seen from the banks of the Shoalhaven River adjacent to the village of Terara is shown in **Plate 6**.

Plate 6: View of Shoalhaven Starches factory site from village of Terara.

The existing Flour Mill and flour uploader are visible from this vantage point. The existing Flour Mill will remain unchanged externally by the proposed modifications with the exception of additional plant that is proposed to be located on the roof of the building and a building extension that is to be located between the existing Flour Mill and silos. The proposed external additions will not be dissimilar to existing structures already located within the existing Shoalhaven Starches complex and will conform to the visual character of the site. Under these circumstances, the proposed modifications will not be

out of context in terms of the existing factory development when viewed from this vantage point.

Cambewarra Lookout

Cambewarra Lookout is situated about 7 km to the northwest of the site. Views from the lookout are from an elevation over 620 m ASL, and encompass the Shoalhaven River floodplain and the coast including Jervis Bay. Whilst the factory site is visible from this vantage point, due to scale of the view, it would be extremely difficult to make out the works associated with the project from this vantage point.

Conclusion

Overall it is considered that the proposed works will not create a significant adverse visual impact given that externally the existing Flour Mill will remain largely unchanged by the proposed modifications with the exception of additional plant that is proposed to be located on the roof of the building and a building extension that will project 5.5m above the existing roofline of the silos. Despite the increase in building height associated with the extension, the overall visual change will be minor given the small footprint of the proposed extension and that it will be viewed within the context of the existing Flour Mill and silo buildings and also within the context of the broader Shoalhaven Starches site.

8.6 TRAFFIC AND PARKING

The Environmental Assessment Requirements as issued by the NSW Department of Planning & Environment (DoPE) for this project required:

> ***Traffic*** *– assess the potential increase in rail and/or road traffic from the modification, including daily trip numbers, assess predicted impacts on the safety and capacity of the rail and road network including consideration of cumulative traffic impacts, detail any infrastructure upgrades required or any other measures to minimise traffic impacts.*

This Modification Application is supported by a Traffic Impact Assessment prepared by ARC Traffic & Transport (ARC) prepared in response to the above requirement. In undertaking their assessment ARC has referenced their previous assessments that have been undertaken in relation to the Shoalhaven Starches site. This assessment has reviewed the potential construction and operational aspects of the proposal, and provides recommendations by which potential impacts can be minimised if not entirely ameliorated. A copy of ARC's report forms **Annexure 8** to this EA. This section of the EA is based upon the findings of this assessment.

According to ARC, the proposal would not increase staff requirements, nor heavy vehicle trip generation; as importantly, the very moderate additional rail freight demand arising

from the proposal would be accommodated using existing train capacity, and as such would not increase the number of trains, nor duration of train crossings, at the Bolong Road level crossing. The only significant potential for the proposal to impact the local transport environment would be during what would be a short two month construction period. This issue is addressed in the traffic assessment undertaken by ARC.

8.6.1 Existing Situation

Site description

The subject site is located on the southern side of Bolong Road, Bomaderry, generally extending east from the intersection of Bolong Road and Railway Street through to the former Dairy Farmers Site (DF Site) which now forms part of the broader Shoalhaven Starches operations.

Access

Access to the broader Shoalhaven Starches site is provided via numerous access driveways, all to Bolong Road. Construction trips associated with the proposal will be generated to a single access point – the Western Access Point, also referred to in previous ARC assessments as Access Point 3 (AP3), immediately west of the Cleary Brothers site on Bolong Road. AP3 is the subject of this traffic assessment.

Traffic Flows

Further to consultation with Shoalhaven City Council (Council) ARC has over numerous years prepared traffic generation forecast for Bolong Road and the numerous site intersections that reflect peak site traffic flows, and 120th Highest Hour traffic flows in Bolong Road; these flows were referenced in recent reports by ARC relating to the site.

Forecast 2016 AM and PM peak hour traffic flows for this assessment are provided in **Figure 12**.

Intersection Performance

SIDRA analysis undertaken by ARC for the 2016 forecast conditions identifies that the intersection operates at a good Level of Service (LoS) ‘B’ in both peak periods with the only delay being to the minor right turn demand AP 3 to Bolong Road and with minimal queue lengths and significant spare capacity.

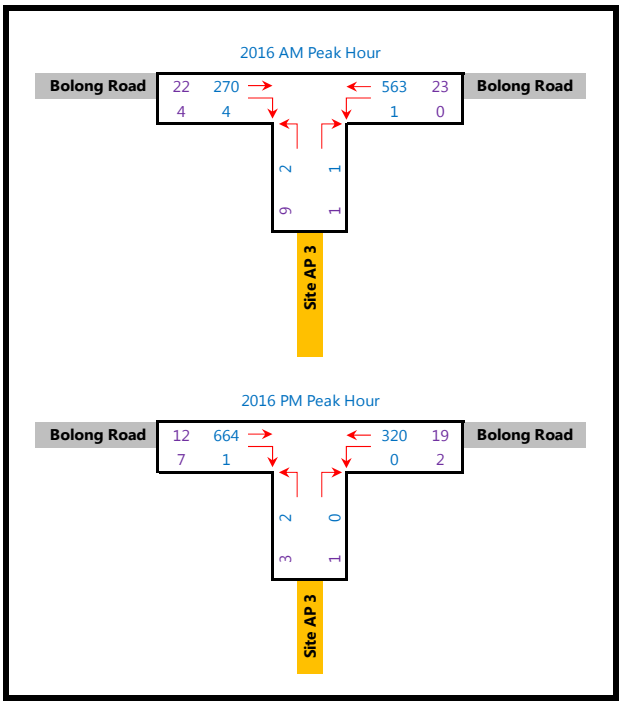

Figure 12: 2016 forecast flows for the intersection of Bolong Road and Access Point 3

8.6.2 Traffic and Access Associated with the Proposal

This Modification Application involves the installation of additional plant largely within the confines of the existing Flour Mill building footprint. A small (3 m x 4 m) building extension is also required between the silos and the Flour Mill building.

The proposed modifications will result in an increase in flour that will be able to be produced on-site by some 2,700 tonnes per week, to a total of 7,700 tonnes per week. Annually, total flour production would increase from the currently approved limit of 265,000 tonnes to 400,000 tonnes, though importantly the total amount of flour used in the production processes across the site will remain within the approved 20,000 tonnes per week limit.

The difference between the existing (approved) rates of flour processing and proposed rates further to the modification are shown in **Figure 4**.

An additional 3,375 tonnes per week of wheat grain will be required to feed the modified Flour Mill. However, this increase would be offset by a reduction in the amount of flour received (2,700 tonnes per week less) for other (off-site) Manildra flour mills. The net effect of the modification is an overall increase in rail freight of some 675 tonnes per week to the site.

Operational Traffic

Once constructed and operational, the proposal would not generate any additional staff or (product carrying) heavy vehicle trips over levels approved as part of the SSEP, but rather simply form part of the existing Flour Mill operations at the site.

Rail Increases

An average of seven (7) flour trains access the site weekly, generally being one flour train per day. At present, there is significant spare capacity within the capacity which would more than accommodate the additional demand further to the proposal. As such, there is no proposal to increase rail movements or the length of trains (and therefore crossing time) at the Bomaderry railway crossing over current approved levels.

Construction Traffic

The only period during which the proposal would generate additional vehicle trips to the local road network would be during construction.

Construction Schedule and requirements

The construction phase is estimated to occur over approximately two months, consisting of a month long construction phase (additional penetrations and structural support) and then a month long mechanical installation phase, and would require:

- Up to 20 construction staff on-site daily (through both phases); and
- Up to 2 construction material carrying heavy vehicles per day for the first month of construction.

Construction access

All access to the construction area will be via AP3, which loops around to the rear of the site and provides direct and immediate access to the existing Flour Mill.

At the intersection of Bolong Road and AP3, the majority of staff trips, and all heavy vehicle trips, are expected to travel to/from the west.

Construction Traffic Generation

During the construction of the existing Flour Mill, specialist staff were transported to and from the site daily by mini-bus. It is expected that staff for the construction and mechanical installation phases of this proposal would travel in an identical manner.

According to ARC, the daily generation of the construction and mechanical installation phase is estimated to be no more than 20 (light and heavy) vehicle trips per day. This estimate allows for a small number of ancillary light vehicle trips on a daily basis.

In the existing peak periods, which could coincide with the arrival and departure peaks of staff and some of heavy vehicle trips (though unlikely given early construction start times), the peak hour generation of the construction phase is estimated to generate no more than 2 – 3 vehicle trips per hour.

8.6.3 Impact Assessment

According to ARC, the construction phase will have little if any significant impact on the local road network simply as a factor of the minimal generation and short duration of the construction phase.

According to ARC, at key intersections to the west and north-west, the construction phase would generate perhaps three (3) additional vehicles per hour, a level of generation that would in no way affect key intersection performance indicators. At the intersection of Bolong Road and AP3 where the construction trips are concentrated, SIDRA analysis indicates that the additional trips would have no impact on forecast base intersection operations, with existing (minor) delays, queue lengths and capacity barely affected.

In summary, the trip generation of the construction phase of the proposal would have no impact on the local traffic environment or on existing on-site operations.

Construction Management

Notwithstanding the findings above, ARC recommend that the construction phase is governed by an appropriate set of management procedures.

In relation to access, traffic and parking requirements during the construction phase, ARC recommends the following initiatives, which essentially mirror the Construction Traffic Management Plan (CTMP) requirements determined by ARC for the construction requirements of previous projects at Shoalhaven Starches:

- All parking for construction staff and construction heavy vehicles will be contained within an appropriately secure on-site environment so as not to impact or be impacted by existing site operations; or on the off-site traffic environment. Such spare parking capacity is available in the immediate area of the existing Flour Mill.
- While it is not anticipated that Restricted Access Vehicles (RAVs) will be required as part of the construction task, it is nonetheless the case that any such vehicles would be required to utilise the existing approved RAV route between AP3 and the Princes Highway via Bolong Road; access for such vehicles via the Railway Avenue bridge is not to be provided.

- Construction work hours are generally between 6:00 am/7:00 am and 5:00 pm/6:00 pm Monday to Friday, with an earlier finish time on Saturdays and no work on Sundays. Construction hours are most often established to minimise amenity impacts on neighbouring residential areas, and will require finalisation further to consultation with Council.

8.6.4 Conclusion

The Traffic Assessment carried out by ARC makes the following conclusions:

- *The proposal will not generate an additional level of operational traffic to the local traffic network.*
- *The proposal will not result in additional rail movements or train crossings of longer duration at the Bolong Road rail crossing.*
- *Construction vehicle trips would be generated over a short period, and will be minimised through the provision of group transport for staff.*
- *The construction trip generation would have no significant impact on the operation of local intersections of access points to the site.*
- *Construction staff parking will be provided adjacent to the construction area.*
- *An appropriate set of construction traffic management strategies will be put in place through the construction period.*

8.7 GEOTECHNICAL AND RIVERBANK STABILITY

The Environmental Assessment Requirements as issued by the NSW Department of Planning & Environment (DoPE) for this project require:

> *Riverbank Stability - assessment of the impacts on riverbank stability, proposed mitigation measures and details of emergency bank stabilisation works in the vicinity of the modification.*

This Modification Application is supported by a Geotechnical and Preliminary Environmental Report prepared by Coffey Geotechnics ("Coffey's"). This assessment has reviewed issues pertaining to geotechnical and riverbank stability in response to the above requirement of the Department. A copy of Coffey's report forms **Annexure 9** to this EA. This section of the EA is based upon the findings of this assessment.

8.7.1 Discussion

The existing Flour Mill is located near (within 10 m) of the section of river bank that is lined with the rock revetment wall, therefore Coffey's requested that an updated round of survey monitoring of the revetment wall be carried out. The survey of the rock revetment was subsequently carried out by Allen Price and Scarratts on 28 September 2015. The

monitoring data was obtained from 10 fixed survey markers embedded on 2 October 2008 in the revetment boulders.

This data was then sent to Coffey's for assessment. Following the round of survey monitoring, Coffey has analysed and assessed settlement and/or lateral movement of the rock revetment wall along the river bank. As advised by Allen Price & Associates, readings taken on 7 January 2009 were used as reference data.

- The total recorded vertical movements during the monitoring period ranged from (+) 11 mm (ie. upwards) to (-) 34mm (ie. downwards). The estimated rates of vertical movements range from (+) 1.65 mm/yr to (-) 5.1 mm/yr;
- The total recorded lateral movements perpendicular to revetment wall ranged from (-) 37 mm (ie. towards the river) to (+) 17 mm (ie. away from the river). The estimated rates of lateral movements range from (-) 5.5 mm/yr to (+) 2.5 mm/yr;
- No cross sections of the river bank have been provided at this stage; and
- Based on the survey monitoring data and the visual observations made during the site walkover on 30 September 2015, the generally downward movement at the top of the revetment wall (as indicated by the N pins) and upward movement at the toe of the revetment wall (as indicated by the S pins) is consistent with creeping rotational ground movement. At this stage, the total movements and rates of movements as indicated above could be attributed to a number of factors including the following:
    - Due to the recent flood event:
        - there has potentially been some change in the river bed profile;
        - there has potentially been some loss of fines behind the revetment wall and short term softening of the materials behind the revetment wall above the normal high tide level that were exposed to the flood waters ;
        - there has potentially been some heaving of the wall driven by the expansion of moisture sensitive soils behind the revetment wall;
    - Ground vibrations and movement due to soil displacement induced by pile driving activities during the construction of the new silos; and
    - The accuracy for the survey as advised by the Surveyor is +/- 5mm.

8.7.2 Recommendations

In relation to the river bank stability, Coffey's recommend the following actions to be taken:

1. *The performance of the revetment wall and the condition of the river bed beyond the toe of the revetment wall will need to be monitored on a regular basis. Conduct regular survey monitoring of the revetment wall every 3 months to assess whether there is an ongoing pattern of movement over the next 12 months. If movement is insignificant during this time monitoring could then be reduced to once per year or after significant rainfall events that result in river levels rising more than 1m above the high tide level. Survey data for the river bed to a distance of 15m off the toe of the wall should also be carried out during the wall monitoring to check for changes in the bed profile;*

2. *Conduct regular visual observations to assess any obvious change to ground features in the surrounding area. The effects of major rain events, flooding or any significant deepening or steepening of the river bed close to the revetment wall will need to be assessed; and*

3. *Regular reviews of the survey data should be undertaken, and ongoing maintenance of the revetment wall or repairs where required.*

8.7.3 Impact on Flour Mill Structure Pile Foundation due to Potential River Bank Movements

As the revetment wall overlies deep alluvial soils, changes to the river bed profile and erosion along the toe of the revetment wall in the future could according to Coffeys result in movement of the wall and subsequently the bank between the revetment wall and the location of the Flour Mill structure.

To assess the impact on the Flour Mill structure pile foundation due to potential river bank movements, the following steps have been followed by Coffeys:

1. Estimate cumulative movement over a period of 20 years as extrapolated from surveyed incremental movements of the revetment wall;

2. Apply the estimated cumulative movement as per STEP 1 as prescribed displacement at the revetment wall in a finite element analysis (PLAXIS 2D version AE) simulation to estimate the induced vertical and horizontal subsoil movements approximately 10 m north from the top of the revetment wall. Output presented in Figure 3; and

3. Assess likely settlement, pile axial load due to vertical soil movement, and axial and lateral responses of the piles due to lateral soil movement. Coffey's in-house computer programmes PIES and ERCAP were used for pile deformation analyses under vertical and horizontal soil movements, respectively.

The assumed pile type and dimensions, properties and boundary conditions for this analysis are as follows:

- Pile type = shaft reinforced and grouted screw pile;
- Screw pile helix diameter = not available;
- Screw pile shaft thickness = 9mm;
- Screw pile shaft diameter = 193mm;
- Pile Young's modulus = 20,000 MPa (long term);
- Pile head boundary condition = free head;
- Pile tip boundary condition = fixed tip; and
- Pile head restraint condition = zero translation restraint.

The estimated pile deformations and structural actions as induced by the potential ground movements are summarised by Coffey's as follows:

- Likely additional axial load = 0.06MN;
- Likely additional bending moment = 0.002MNm;
- Likely additional shear force = 0.002MN
- Likely pile head movement (vertical) = 12mm;
- Likely pile head movement (horizontal) = 10mm; and
- Likely pile head rotation = 0.0026 radians.

According to Coffeys the above analysis demonstrates that the effects of the modelled river bank movements on the Flour Mill structure following modifications will be negligible and not affect its structural integrity.

8.7.4. Impact on River Bank Stability due to Additional Pile Foundation Loads

Coffey's indicate the additional structural vertical loads have been assessed by Recaf Design. It is understood from Recaf Design that the vertical loads had been assessed on a grid system where foundation design elements are understood to carry the loads. Excluding the wall panel loads, it is also understood that the additional loads due to the proposed modifications would represent a load increase ranging from less than 1% to as high as 7.3%. Including the wall panel loads, and as assessed by ATB Consulting Engineers, the total foundation load would be considered to be within the design capacity of 500kN per individual screw pile.

According to Coffeys it is likely that the loads induced by the proposed modifications will be transferred to the piles founded in highly weathered sandstone.

Assuming that each of the screw piles remain aligned with its main axis, the potential corrosion due to adversely aggressive environment does not compromise the required structural pile thicknesses, and the screw piles are adequately socketed into the highly weathered sandstone, ground deformation due to the proposed additional loads according to Coffeys is considered to be minimal and its impact on the river bank stability would be insignificant.

8.7.5 Conclusion

Coffey's river bank stability assessment in relation to this proposal concludes:

> *The above report summarising our assessment and advice is based on our visual assessment of the area and review of available information including that provided by other parties. As the Manildra plant is located next to Shoalhaven River where there is some risk of flooding occurring, regular monitoring of the revetment wall and adjacent river bed, and the general condition of the river bank. Coffey should be advised of any obvious changes to ground features along the river bank, including the revetment wall.*

9.0 STATEMENT OF ADDITIONAL COMMITMENTS

Section 8.0 of the EA for the Shoalhaven Starches Expansion Project prepared by our firm provides a Statement of Commitments agreed to by Shoalhaven Starches Pty Ltd outlining environmental management, mitigation and monitoring measures to be implemented to minimise potential impacts associated with the proposed Flour Mill modifications and having regard to the findings of the EA.

The only additional commitments arising from this modification proposal include the following:

9.1 PRELIMINARY HAZARD ANALYSIS

Table 19 outlines recommended additional management procedures and design considerations that Shoalhaven Starches commits to implementing and incorporating into practices that would prevent and / or minimise risk scenarios from occurring.

Table 19

Preliminary Hazard Analysis

Preliminary Hazard Analysis
Shoalhaven Starches commits to implementing the recommendations made by Pinnacle Risk as detailed in Table 1 of their PHA in relation to this Modification Application.

9.2 NOISE

Table 20 outlines the recommended additional noise mitigation measures and design considerations that Shoalhaven Starches commits to implementing and incorporating into the design, construction and operation of the proposed Flour Mill modifications.

Table 20

Noise Mitigation Measures

Measures and Design Considerations
Shoalhaven Starches commits to implementing the recommendations made by Day Design Pty Ltd in relation to noise impacts and which included: ***Fan Silencers*** It is proposed to fit each of the fans with silencers. Day Design recommend fitting silencers to the discharge side of each fan. Each of the silencers should achieve the minimum insertion losses shown in the Table below.

Table 20 (continued)

Measures and Design Considerations

Silencer Insertion Losses

	Minimum Insertion Loss (dB) at Octave Band Centre Frequencies (Hz)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Fan – 160-040030-00 Silencer - NAP Silentflo H45/240	11	19	33	45	43	29	20	17
Fan – 160-016030-00 Silencer - NAP Silentflo H45/180	8	15	25	35	34	23	17	14
Fan – 031-018030-00 Silencer - NAP Silentflo H45/90	3	9	13	20	20	14	14	9
Fan – 035-007530-00 Silencer - NAP Silentflo H45/90	3	9	13	20	20	14	14	9

9.3 VISUAL IMPACT

As outlined in Section 8.5 of this EA it is our view that the proposed works will not create a significant adverse visual impact given that externally the existing Flour Mill will remain unchanged by the proposed modifications with the exception of additional plant that is proposed to be located on the roof of the building and an external extension between the Flour Mill and silos which will have a height of 40 m. Shoalhaven Starches commit to the following additional measures as outlined in **Table 21** to assist in screening and further minimising visual impacts arising from the proposed works.

Table 21

Visual Impact

Measures
Shoalhaven Starches commits to where appropriate and possible, the proposed alterations to the existing Flour Mill building should be constructed of similar materials as those previously used on the site and be of a non-reflective nature. Colours should blend with existing structures on the site to ensure visual harmony. Consideration should be given to incorporating a cladding colour if possible which will match existing development on the site.

9.4 TRAFFIC

As outlined in Section 8.6 of this EA it is the view of ARC that there are no access, traffic or parking impacts associated with the proposal – either during operation or construction – that would significantly impact on the efficiency and/or safety of the local traffic environment or existing on-site operations. The trip generation of the proposal during construction would be extremely minor, while once operational the proposal is not expected to generate any additional trips to the local road network.

Shoalhaven Starches however commit to the following additional measures as outlined in **Table 22** to assist in minimising traffic impacts arising from the proposed works.

Table 22

Traffic Impacts

Measures
In summary, the trip generation of the construction phase of the proposal would have no impact on the local traffic environment or on existing on-site operations. Shoalhaven Starches however commit to the following recommendations made by ARC in their TIA for this project: ***Construction Management*** *In relation to access, traffic and parking requirements during the construction phase, ARC recommends the following initiatives, which essentially mirror the Construction Traffic Management Plan (CTMP) requirements determined by ARC for the construction requirements of previous projects at Shoalhaven Starches:* • *All parking for construction staff and construction heavy vehicles will be contained within an appropriately secure on-site environment so as not to impact or be impacted by existing site operations; or on the off-site traffic environment. Such spare parking capacity is available in the immediate area of the existing Flour Mill.* • *While it is not anticipated that Restricted Access Vehicles (RAVs) will be required as part of the construction task, it is nonetheless the case that any such vehicles would be required to utilise the existing approved RAV route between AP3 and the Princes Highway via Bolong Road; access for such vehicles via the Railway Avenue bridge is not to be provided.* • *Construction work hours are generally between 6:00am/7:00am and 5:00pm/6:00pm Monday to Friday, with an earlier finish time on Saturdays and no work on Sundays. Construction hours are most often established to minimise amenity impacts on neighbouring residential areas, and will require finalisation further to consultation with Council.*

9.5 RIVERBANK STABILITY

Table 23 outlines recommended additional management procedures that Shoalhaven Starches commits to implementing and incorporating into practices to address riverbank stability issues.

Table 23

Geotechnical and Riverbank Stability

Management Procedures
In relation to the river bank stability, Shoalhaven Starches commits to the following recommendations made by Coffey's the following actions: *a) The performance of the revetment wall and the condition of the river bed beyond the toe of the revetment wall will need to be monitored on a regular basis. Conduct regular survey monitoring of the revetment wall every 3 months to assess whether there is an ongoing pattern of movement over the next 12 months. If movement is insignificant during this time monitoring could then be reduced to once per year or after significant rainfall events that result in river levels rising more than 1m above the high tide level. Survey data for the river bed to a distance of 15m off the toe of the wall should also be carried out during the wall monitoring to check for changes in the bed profile;* *b) Conduct regular visual observations to assess any obvious change to ground features in the surrounding area. The effects of major rain events, flooding or any significant deepening or steepening of the river bed close to the revetment wall will need to be assessed; and* *c) Regular reviews of the survey data should be undertaken, and ongoing maintenance of the revetment wall or repairs where required.*

10.0 CONCLUSION

In 2009 the Minister for Planning issued Project Approval for an application made by Shoalhaven Starches to increase its ethanol production capacity at its existing ethanol plant located at the Shoalhaven Starches Plant at Bomaderry. This Project Approval enables Shoalhaven Starches to increase its ethanol production in a staged manner at its Bomaderry Plant from the current approved 126 million litres per year to 300 million litres per year.

The Project Approval also consolidated all previous approvals including Project Approval MP 07_0021 (the Flour Mill) into the one Project Approval.

Following the Minister's determination Shoalhaven Starches have been implementing and commissioning works in accordance with this approval.

15,000 tonnes per week of flour is approved to be transported to the site by rail for use in the production process at the site in conjunction with the 5,000 tonnes per week of flour that is approved to be milled by the existing Flour Mill located on the site approved in 2007.

It is now proposed to undertake modifications to the existing Flour Mill to increase industrial grade flour production at the Bomaderry Plant. This will enable subsequent spare capacity at the Company's other Flour Mills to be devoted to the production of higher grade flour therefore increasing export opportunities for the Company.

The proposal will not alter the approved flour consumption of the plant, which will continue to be limited to 20,000 tonnes per week.

The proposed modifications to the existing Flour Mill will enable 3,375 tonnes of grain to be processed per week producing 2,700 tonnes of flour per week. In conjunction with the flour already processed on the site, this will mean that 7,700 tonnes of flour will be able to be produced at the Bomaderry plant per week, reducing the amount of flour that is required to be transported to the site from Manildra to 12,300 tonnes. The overall amount of flour processed at the site will however remain at the existing approved 20,000 tonnes per week.

The application is made pursuant to Section 75W of the Environmental Planning & Assessment Act 1979.

The preparation of this Environmental Assessment has been undertaken following consultation with the Department of Planning & Environment. This Environmental Assessment has been prepared to address issues detailed in requirements supplied by the Department.

Following a comparison of the modified proposal to that originally approved having regard to the key issues originally identified associated with this Project, this Environmental Assessment concludes that the proposal is suitable for the site and this locality and consistent with the objects of the Environmental Planning & Assessment Act.

The Minister's approval of this proposed modification to Project Approval MP 06_0228 is sought.

ANNEXURE 1

ANNEXURE 1

Plans of Proposed Alterations

to Existing Flour Mill

ANNEXURE 2

Requirements
of the
Department of Planning & Environment

ANNEXURE 2

ANNEXURE 3

Submission under Clause 4.6
of Shoalhaven LEP 2014

prepared by

Cowman Stoddart Pty Ltd

ANNEXURE 3

ANNEXURE 4

Flood Impact Assessment

prepared by

WMAwater Pty Ltd

ANNEXURE 4

ANNEXURE 5

ANNEXURE 5

Air Quality Impact Assessment

prepared by

Stephenson Environmental Management Australia

ANNEXURE 6

Environmental Noise Impact Assessment

prepared by

Day Design Pty Ltd

ANNEXURE 6

ANNEXURE 7

Preliminary Hazard Analysis

prepared by

Pinnacle Risk Management

ANNEXURE 7

ANNEXURE 8

Traffic Impact Assessment

prepared by

ARC Traffic & Transport

ANNEXURE 8

ANNEXURE 9

Geotechnical Assessment
(Riverbank Stability)

prepared by

Coffey Geotechnics

ANNEXURE 9